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Justifiable thrift or feverish animal spirits: What stirred the corporate credit crunch in Poland?

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30 June 2011

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MPRA Paper No. 56613, posted 03 Jul 2014 18:15 UTC

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**Justifiable Thrift or Feverish Animal Spirits:
What Stirred the Corporate Credit Crunch
in Poland?**

Master thesis
Major: Finance and Accounting

The thesis developed under the supervision of
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Warsaw, June 2011

Abstract

This master/second-cycle dissertation concerns the problem of corporate credit in Poland and tries to determine the sources of banks' unexpected hesitance to provide enterprises with additional liquidity, which was observed during the global financial crisis. It differentiates between fundamental and non-fundamental determinants, which – when combined – reconstruct the course of events that led to the slowdown. A special attention is devoted to variables believed to be behavioral and theoretically inconsistent with the conventional belief of how lending activities are coordinated. A structural vector autoregression (SVAR) is run and impulse response functions are produced to provide a numerical support for the developed theoretical framework.

Keywords

corporate credit, credit crunch

JEL Classification

E5, G21

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INTRODUCTION

The current credit crisis has reminded decision makers of the essential role performed by credit institutions in supplying capital to the economy, principally under financial distress. Credit facilities, if distributed equitably and at a fair price, thus being the crucial part of financial system stability, are vital stimulator of the economic growth. No major economy is capable of prospering without them. According to Factiva, a Dow Jones & Company and Reuters joint venture, which provides media monitoring tools, the phrase “credit crunch” appeared nearly 200,000 times in English speaking media in 2008. This figure halved in 2009 and in 2010 there were only slightly more than 30,000 mentions. This shows how calling the issue was it at the time of its uppermost magnitude globally.

According both to the Polish press and to the foreign-based journalists, Eastern European markets generally steered clear of the crisis and the conventional credit crunch did not happen, as the reasons of credit contraction lied not only on the supply side, but also on the demand side. However, the plain fact is that some form of retrenchment took place. On the basis of their own resources, enterprises may expand only to a limited extent.

This thesis is designed to address and answer the question, what influenced Polish banks’ lending policies during this period and whether these policies deliberately aimed at the reduction of credit supply, or the contraction was one of their side-effects.

This paper is neither to woe about the consequences of credit squeeze, nor to delineate policy recommendations of how to combat it. The research question is formulated clearly: what led to the corporate loans being choked off in a relatively remote economy, far from collateralized debt obligations, where banks did not find themselves anywhere near the verge of bankruptcy and the government almost did not have to manually safeguard the sector from collapse. In other words, the challenge is to define where the seeds for the crunch were planted, categorize those “seeds” as fundamental or behavioral, and try to apprehend whether these driving forces may potentially differ from the conventional regressors in a long-term model.

The paper is organized as follows. The first section contains introductory material, provides background and highlights stylized hypotheses for further research. The second section is devoted to the review of recent literature, as well as to data analysis and the mechanisms which links the stylized facts with corporate credit volumes. In the third section, behavioral dimension is examined. The fourth section presents and interprets estimations of the structural model’s equations. The last section concludes.

CHAPTER I

UNDERSTANDING THE CREDIT CRUNCH

The recent crisis has dominated the public discourse in recent years. The pertaining issue is undoubtedly complex and very difficult to fathom out thoroughly. This is why the deep analysis of current developments requires a careful selection of sufficiently narrow topics. The credit crunch is only one out of several main dimensions of the crisis, which include also e.g. financial markets, real estates or public debt issues. However, in the field of lending, the most vociferous media coverage concentrated mostly on housing and consumer loans, rather than on corporate credit problems. While the first ones were probably most interesting to the media recipients, the latter are thought to be more vital for the economy. Nevertheless, focusing on corporate credit in Poland is a sufficiently narrow perspective, allowing for an in-depth exploration of the subject. The crisis itself is treated here as a context, leaving room to a partly fundamental and partly behavioral analysis of corporate credit volumes.

As figuratively noted by Alan Abelson (in Pixley, 2004: 161), former editor of “Barron’s”, ‘social relations of money between creditors and debtors have greater structural importance today than those between labour and capital’. If so, understanding of what influences these relations is a non-negligible assignment. Well before the crisis broke out, Rajan (2005: 37) wrote that market liberalization along with institutional change that made the way to improve credit and risk sharing opportunities, left the world more interlinked than ever before, and no country will be immune from the consequences of this “blessing or curse”. Poland is now praised to be somewhat a safe haven, but if a similar contraction repeats itself in future, the upshots of it will be more upsetting. At least this was the case with Ireland, Portugal and Spain, where, after the adoption of euro (a likely event to happen in Poland during the current decade), corporate lending got into its stride. The severity of crunch that emerged afterwards was augmented by a country’s negative balance of payments, which contributed to a sharp decline of potential GDP. (Woreta, Sankowski and Sepielak, 2010: 20) No prophet is needed to make us realize that a similar scenario for Poland is not just a piece of bad fantasy writing. Additionally, the prevalence of corporate lending in Poland is still subject to a massive catch-up, since it is estimated that only two out of ten Polish firms utilize credit facilities in their investment activity, as compared to seven out of ten doing so in the European Union (Czerwińska and Wilkowicz, 2011). 38 percent of Polish enterprises have

literally no contact with credit facilities and overall, the share of credits in Polish firms' total liabilities does not even amount to 20 percent (Bratkowski and Myjak, 2009: 6).

Hence, this paper's contribution to the pool of knowledge on corporate credit-related logic in Poland lies in the explanation of the crunch with the use of four-dimensional matrix of determinants: demand-side, supply-side, monetary and regulatory, and behavioral.

1.1. Origination of the crunch

Credit crunches are relatively infrequent, rarer than stock market slumps, and these two are not, in principle, correlated. For example, although the 2000-2002 stock market downturns were substantial, they were not followed by a credit crunch. Even during 1982 and 1989-1992 slumps there was no serious crunch, at least in the domestic U.S. market. As Martin Hutchinson (2007) wrote, the last true credit crunch was thus that of 1973-1974, which was particularly severe in Britain but spread throughout the international debt markets. This was, naturally, before the working lifetime of most market participants today.

If economic historians were to sketch the ever-present pattern of financial crises, they would develop more or less the following story. The source of the crisis is marked by a move of profit opportunities into a particular sector. This leads to omnipresent exhilaration and painting rosy pictures, which prompt overtrading, speculation, monetary expansion and, last but not least, lending to the hilt. Charles P. Kindleberger (in Pixley, 2004: 169) stresses that under such circumstances 'financial institutions accept liability structures that decrease liquidity, and that in more sober climate they would have rejected'. This must finally trigger a sudden plunge and a panic, which is still just calm before the storm. A subsequent fall in prices reduces the value of collateral and induces banks to think twice before they lend again, which causes a hurry-scurry across the banks' stakeholders. If it results in firms becoming insolvent, bank loans go bad and the stakeholders may no longer pretend that nothing happened. Whoever is hit, sells its worst securities if it is still possible, and its best – if it is unavoidable, in order to add to the liquidity.

The recent credit crunch was barely an exception. Both its early stirrings in late 2006 and its subsequent global impact in the following years actually harmonized with this outline. Obviously, several peculiarities intensified its magnitude. These were particularly financial innovations, as well as poor risk management and inept supervision. Returning to the point, the crisis was sparked by the collapse of the US subprime mortgages in mid-2007, and continued to affect other countries and markets over the course of the following years. The

channels, through which the disease has been streamlined, were the securitized bonds, held by many banks and insurers across the developed world. Lenders essentially sold the debt, including the most insidious subprime mortgages (mortgage-backed securities), almost straight away to the big Wall Street banks. Millions of these mortgage debts were pulled together, into deceiving collateralized debt obligations (CDOs), which, being highly overvalued by rating agencies in a way that did not mirror their actual risk, were later sold on to investors. Meanwhile, in many parts of the United States, house prices were slipping, undermining the value of the collateral (Foley, 2007).

Lending in the developed world experienced enormously tough time. For the first time in modern European history monetary mass shrank in absolute terms for three months, while historically the average historic monthly growth of euro M3 was around 50 billion euro. This means that the credit crunch has had a swift effect in the euro area of at least around 150 billion euro of M3 vanishing.

A harsh contraction in the availability of bank credit was a direct outcome of this unsustainable capital structure. Banks experienced financial distress not only because the securities they held defaulted, or dramatically depreciated. Additional reasons were the defaulted loans of economic agents, who were equally badly hit by the crisis, and the increased interest rates, which contribute to the increased cost of capital. In markets at the center of the conflagration, such as the United States and the United Kingdom, the authorities had to rescue imperiled financial institutions (Economist Intelligence Unit, 2008). The recessionary atmosphere was in the air and further contractions were only a matter of time.

By contrast, neither Japan nor most of emerging markets suffered substantial direct impact. Only a handful of banks in these countries had any exposure to subprime mortgages or junk securities. Virtually no one held them in Poland. Therefore, in the developing world, there were few signs of deterioration at all. Hungary was among the first emerging market countries to face the credit crunch, as its vulnerability stemmed from ‘fiscal deficit, reliance on external financing, and the extent of domestic, particularly household, borrowing in foreign currency’ (Berger, Molyneux and Wilson, 2010: 861). Despite of this evidence, some researchers and the media argue that the emerging economies turned out to be so-called safe havens during this crisis, whereas they usually tended to be their main originators (Russia, Far East, Brazil). Some maintained that this is one of the most remarkable aspects of this global crunch. This does not hold for all developing countries, but there are only few exceptions to this general statement. No doubt that this is little exposure to the toxic subprime assets that

sheltered them from serious turbulences. Thus, in a way, emerging economies paradoxically benefited from their own backwardness.

On the contrary, there are scholars and business practitioners, who claim that describing the crisis with the slogan ‘damage at the center, havens in the peripheries’ (Economist Intelligence Unit, 2008) is a too far-reaching simplification. It may indeed seem so from the Western perspective, but the underlying situation was a bit more puzzling. In absolute terms, the credit crunch, or at least slowdown, took place in the emerging economies as well. It was unquestionably not an aftermath of overinvesting in financial innovations, but rather the effect of decreased demand for exports and limited access to external funding (Brzoza-Brzezina and Makarski, 2010: 8). This hypothesis is confirmed by the underlying data. The ratio of outstanding bank loans to GDP in 2008 was only 52 percent in Poland (comparing to 116 percent in the euro zone), while the ratio of exports and imports of goods to GDP in 2008 was 70 percent in Poland (comparing to only 34 percent in the euro zone). This makes Poland less prone to a credit crunch and more prone to a plunge in external demand. (Brzoza-Brzezina and Makarski, 2010: 40).

Unlike the previous crises, from the early 1980s to the late 1990s, the current one originated in developed economies and did not spread to emerging markets. Thus the predominant pattern of crises was reversed. However, to learn what has happened there in the meanwhile, the next chapter discusses the contemporaneous economic outlook in Poland.

1.2. Background of the domestic slowdown

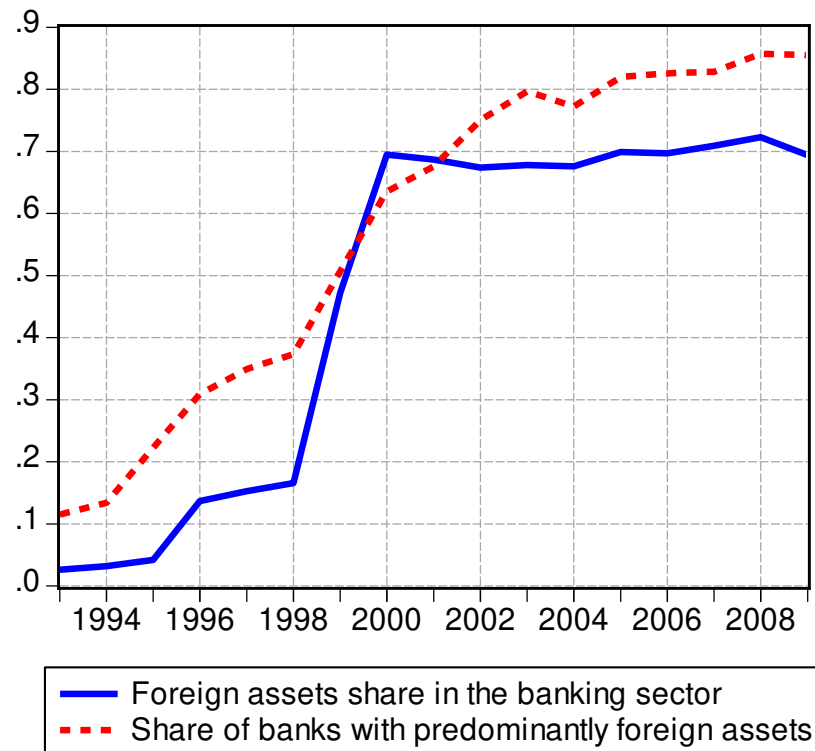
In general, the credit crunch moved outward from financial centers in the second half of 2008. But as it has already been said, the subprime crisis had merely slight direct impact in the leading emerging markets, including Poland, which had made only pint-sized investments in the toxic asset-backed securities. However, it has also been affirmed that an idyllic landscape of ubiquitous economic growth in the peripheries, and the crisis isolated in rich-world financial centers, is by far an exaggeration. Let’s stop for a while to take a look, by which channels the crisis radiated out from the well-developed world and exacerbated into a sort of nerve-racking disease in Poland.

The crunch of 2009 did not emerge as an unexpected shock. But its magnitude confused not only the optimists as Deputy Prime Minister, Waldemar Pawlak, but also pessimistic experts, as well as down-to-earth, full-fledged and tepid bankers. It was hardly believable that the credit dynamics will reach somewhere between 8 and 12 percent of yearly growth,

allowing for preservation of the 3-percent GDP growth (see Glapiak, 2008; Kawalec, 2008). The pessimists declared the worst case scenario is 0 percent growth. In fact, the corporate lending decreased by more than 4 percent throughout the 2009 and, what is more, failed to improve its standing throughout the whole 2010, while decreasing further by 1.6 percent. Lending in foreign currencies was even more affected.

The issue of reduced corporate credit must be explored as a part of a broader landscape of the Polish banking sector. It consists of about 50 domestic banks, nearly 20 affiliates of foreign-based banks, which do not have to abide by the domestic banking regulations, nearly 600 cooperative banks, and roughly 1,800 so-called SKOKs, operating as credit unions, which also do not have to bother about the Polish Financial Supervision Authority's (Komisja Nadzoru Finansowego, later referred to as KNF) set of laws.

Considerable share of foreign capital in the banking sector is typical for Central and Eastern European economies. Internationalization in Poland was "invited" and welcomed, not really unintentional. Foreign financial institutions were, back in the 1990s, meant to facilitate the integration of Polish banks with international markets. Yet in 1995, the asset share of foreign-owned banks in total banking assets of Poland amounted to only 4.2 percent, which was quite modest ratio as compared with Hungary (41.8 percent), Slovakia (32.7 percent) or Czech Republic (15.9 percent). This translated to seriously underdeveloped credit facilities, as total lending accounted for only 12.7 percent of GDP, twice below the percentage in Hungary and Slovakia, and fourfold below Czech Republic (Berger, Molyneux and Wilson, 2010: 848-849). Eventually, among fears and prejudices, political decisions have been made to make this transition possible at the end of the last century. Due to accusations of market manipulation, consolidations were preferred to IPO privatizations, but the process was still lethargic. A sustained public uproar led to the situation that two large banks were still state-owned in 2005, PKO BP and BGŻ (Berger, Molyneux and Wilson, 2010: 852-853). However, solely in terms of the asset share of foreign-owned banks, Poland outperformed all major transition economies yet by 1999 with 69.5 percent. This further raised to 74.2 percent in 2005, but by that year Slovakia, Czech Republic, Croatia and Hungary managed to allure even more foreign ownership and to leapfrog Poland once again. Between 1999 and 2005, Poland's loans-to-GDP ratio failed to take off and remained at a poor level of 27.0-27.5 percent, well below the European Union average in providing credit to the private sector (Berger, Molyneux and Wilson, 2010: 856-860). One of the disadvantages of foreign ownership, emphasized quite sturdily back in the 1990s, was the limited enforceability of monetary policy. We shall return to this issue later on.



Source: Daruk, W., Michalewska, B., Stalkowski, B. (n.d.).

Figure 1. Foreign assets' share (percentage) and foreign banks' share (percentage) in the Polish banking industry.

Currently, Italian capital dominates in the Polish banking sector (ca. 14 percent in September 2009), along with German (ca. 10 percent), Dutch (ca. 10 percent), American (ca. 6.5 percent) and Belgian (ca. 6.0 percent). Following the recent sale of BZ WBK by Allied Irish Bank, Irish shares (ca. 5 percent) will disappear, being replaced by Spanish.

Solvency ratio and the level of internationalization proved to change correspondingly, i.e. it was normally greater in those banks, which were foreign-owned, and which overall contributed to the increased stability and the affirmative perception of the whole sector. This is coherent with Bonin, Hasan and Wachtel (2005), who proved empirically that foreign ownership leads to more efficient banks in transition countries. They find that foreign-owned institutions are more cost-efficient and provide better service. The evidence is so strong that foreign-owned banks not only overwhelm government-owned domestic banks, but also the ones which were privatized, but the domestic capital remained. However, what proved beneficial during peaceful times obviously does not need to perform equally well in a turbulent setting. While de Haas and van Lelyveld (2006) in a now bit outdated research maintain that foreign banks have had a stabilizing effect on total credit supply in CEE

countries, one would say, this time it was different. The only major bank that overcame the widespread aversion and managed to sustain the growth in corporate lending was fully Polish “national champion” PKO BP (Więclaw, Kurasz and Stypulkowski, 2011). In each quarter in 2008 and 2009 PKO BP issued from 2 to 4 bn PLN of new corporate loans (Bratkowski and Myjak, 2009: 25-26). No doubt that this significantly alleviated the impact of the contraction. However, as noted by Berger, Molyneux and Wilson (2010: 864), it is ambiguous whether the central banks of transition countries would be able to ‘maintain liquidity in the banking sector and confidence in domestic institutions if the foreign parent banks withdrew support’. The KNF has made it clear that only one third of Polish banks have reduced lending, while the other ones have not. This, however, may not hold for corporate lending exclusively (Bratkowski and Myjak, 2009: 6).

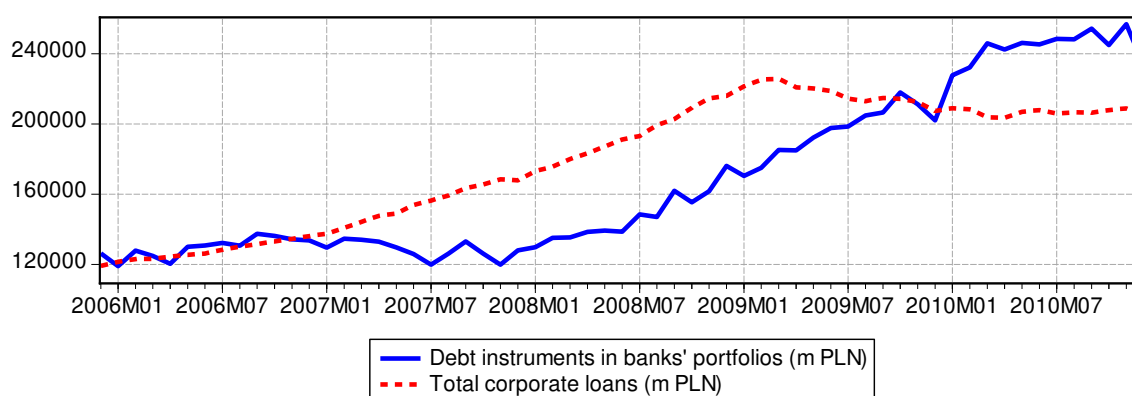
The findings of Kruszka (2011: 16-18), whose data set stretches from 2000 to 2009 and covers twelve CEE economies, are also very valuable in this respect. In substance, there is a statistical correlation between the level of financial-wise international integration and the growth in credit volumes. Foreign-owned banks had on average a yearly growth rate reaching 9 percentage points, as compared with domestic credit institutions. Though, the low significance of this interrelation is stressed. What was statistically more compelling was the influence of rating assessment of the foreign-based parent company. Its deterioration implies a significant decrease in growth rate of outstanding credit volume. Thus, the very presence of foreign-based banks in the economy is not a risk factor *per se* (neither is it a blessing factor, though, as the bank may happen to be low-rated). Still, the author does not differentiate the influenced credit volume by corporate and consumer, which posits a threat that the results are not fully relevant for this study.

Finally, Furceri and Zdzienicka (2011: 17-18) analyze whether the share of foreign liabilities in the banking sector has an impact in shaping the response of output to financial crises. The hypothesis is convention, i.e. the greater the foreign share is, the more vulnerable is the economy. Indeed, this is what results have shown. The long-run effect on output is 3 percent higher in countries characterized by a higher share of banks’ foreign liabilities compared with countries with a smaller share.

Another interesting feature of the Polish banking sector is its excess liquidity. Typically, even a small-scale depression, in the age of economy understood as a system of communicating vessels, may trigger a chain reaction and spread quite efficiently, e.g. through the banks’ liquidity constraints, with all its consequences. However, this might be alleviated in Poland, as the domestic sector is known for its excess liquidity, as pointed out by Pietrzyk

(2005), Pietryka (2010), Wilkowicz (2011a), and indirectly also by Grodzicki, Hałaj and Żochowski (2010: 21), who remind that most of Polish banks are foreign-owned and, when in need, may effortlessly obtain extra funding. Excess liquidity amounted to 23,940 m PLN in 2009, following the 118 percent growth as compared with 2008 (National Bank of Poland, 2010: 44-45). It amounted its record highs in April 2011, when the NBP reported to collect 101,8 billion PLN from banks as a result of the auction of 7-day money market bills (Glapiak, 2011). This gives an idea of how big the excess liquidity actually is. Perhaps, this is also why the banking sector in Poland and their prospects, as regards liquidity risk, seemingly have not been considered as topical by the government. The Council of Ministers limited its effort to guarantee bank deposits up to 50,000 EUR (Balakrishnan, 2008).

As shown below, the liquidity remained lavish, since banks were able to invest much in debt instruments. Bratkowski in Bratkowski and Myjak (2009: 10) remarks, however, that only some banks had huge numbers of money market bonds (i.e. they needed to allocate the excess liquidity somewhere), while some exhibited enormous amount of repo transactions (i.e. they were in need of liquidity). This dichotomy indicates that the situation of banks might have been highly polarized.



Source: National Bank of Poland.

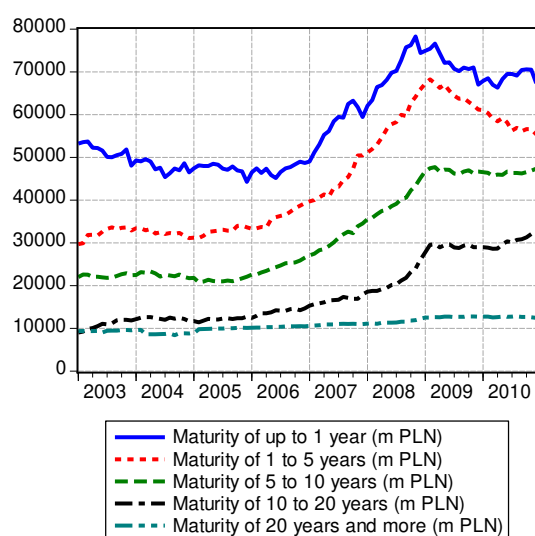
Figure 2. The figure illustrates that Polish banks stayed liquid regardless of the slowdown, as they have been relentlessly purchasing new debt securities, even after they decided to narrow their lending activity.

The recurring question of whether Polish banks were adjusting credit amounts to actual liquidity struggles, or the ones that, they predicted, are going to occur, seems self-explanatory. If liquidity concern was an issue, it referred to the future, not the present.

Re-entering into the main topic, the magnitude of collapse was most notable in operating loans (decrease by 10.5 percent), while there was a slight rise in investment and real

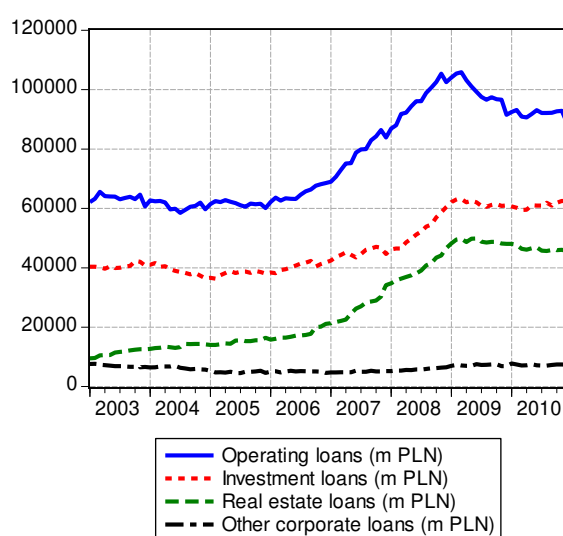
estate credit, by 0.9 percent and 2.8 percent respectively. However, one must notice that the latter are typically long term and the sustained growth might result from the release of consecutive stages of financing, while the credits themselves had been accepted yet before the crisis broke out.

From eyeballing the figures below it becomes clear, which types of corporate loans suffered most. The magnitude of collapse was most notable in operating loans (a year-on-year decrease by 10.7 percent in December 2009, and 2.6 percent a year later), while there was a slight rise in investment and real estate credit, by 0.9 and 3.1 percent in December 2009, respectively. In 2010 investment loans maintained a rising trend and grew by 2.1 percent, while property loans slumped by 5 percent. However, both investment and real estate lending is by virtue of its long-term characteristics more stable and sustainable. Sanguine plot of their value might therefore result from the activation of next stages of financing, while the credits themselves had been accepted yet before the crisis broke out. It is yet to be seen whether these levels will drop in the coming future following the lagged effects of contractionary steps.



Source: National Bank of Poland.

Figure 3. Corporate lending volume in Poland broken down by loan's maturity.



Source: National Bank of Poland.

Figure 4. Corporate lending volume in Poland broken down by loan's purpose.

A number of experts point out that the preservation of the 2006-2008 rates of growth in lending seemed to be practically unfeasible, because of both limited sources of financing and unavoidable turnaround in prosperity (see Zaleska, 2010). The share of non-performing loans heaved by 79.2 percent (from 13,5 billion PLN to a shocking 24,3 billion PLN) and their share in banks' portfolio boosted from 6.1 to 11.4 percent. As a result of the above mentioned

tendencies, the structure of banks' lending portfolios changed dramatically. In 2009 corporate credit accounted for 33.9 percent of total lending, as compared with 37.5 percent in the previous year. As problems accumulated economists stood up to warn against possible payment gridlocks – as banks were reluctant not only to grant new investment loans, but also short term working capital loans (Samcik, 2009; Zaleska, 2010).

The end of 2009 and the beginning of 2010 brought some weak symptoms of revival, as banks loosened their lending policies. These measures concerned credit terms and conditions for small and medium-sized enterprises (later referred to as SMEs). But banks continued to be reluctant on long term engagements, preferring short term lending.

In 2010, the situation more or less resembled a deadlock, caused by the mismatch between supply side and demand side preferences. Those who might be issued a credit, did not need to apply for it, whereas those who desperately needed it, did not meet banks' sophisticated criteria. The press wrote that it is “credit clench” which substituted credit crunch (Twaróg, 2010). In response to this situation, enterprises started to accumulate capital and either postpone investments or finance them with their own funds. Banks, on the contrary, struggled to drain the swamp of unwanted excess liquidity by crediting local government entities (Olczak, 2010). A deficient substitute in the long run. Moreover, it was during the crisis when banks understood how important it is to take care of long term relationships with their clients. This “enlightenment” gave rise to the so-called “war on deposits”, in effect of which the most successful credit institutions accrued decent funds and, though still having considerable risk aversion, simultaneously exhibited increased “risk appetite”. But as of January 2011, average margin for corporate credits amounted 2 percent, with the lowest ones of approximately 1.5 percent. It was still a serious worsening, as margins at the level of about 1 percent were common yet in 2008 (Olczak, 2011).

However, some prominent economists, like Jacek Osiński, deny the term “credit crunch” when describing the situation in Poland since 2009. Osiński benchmarks the current crisis with the previous ones in Poland and CEE, which were greater in magnitude. This line of reasoning is supported by Jadwiga Zaręba who argues that a “minor adjustment” is the phrase we should use. (Bratkowski and Myjak, 2009: 5-6)

Bratkowski, given the foundations of credit contraction in Poland, which were distinct from those in the Western economies, suggests that this reduction does not “deserve” a label of a credit crunch (Bratkowski and Myjak, 2009: 15). True, Poland experienced neither upsetting banking sector nationalization (see the United Kingdom), nor equally troublesome Fortis Bank bailout (see Belgium, France and the Netherlands), not even mentioning the

monstrous American life buoy embodied by the Troubled Assets Relief Program (TARP) worth 700 bn USD (Gadomski, 2009). Bratkowski concludes his interpretation with a somewhat controversial statement that even if this was a credit crunch, it was exactly what the Polish economy needed at that time, since the slowdown indirectly contributed to the reduction of disequilibria in international trade and re-appreciation of zloty (Bratkowski and Myjak, 2009: 15).

A home-grown analysis of the banking sector's response to the crisis-related externalities was articulated by Richard Mbewe (2011). According to him, what was the most prevailing fear was the fact that these are foreign institutions which are owners of most Polish banks. Moreover, these institutions are based in the countries quite heavily touched by the crisis. Nevertheless, the data very strongly contradicts the gossip that parent banks drained their daughters from capital (Bratkowski and Myjak, 2009: 10). While interbank market faded out, the foreign source of liquidity not only did not dry out completely, but actually flourished. There was a clear and most probably not a spurious correlation between the lending levels and the inflow of foreign funds. Polish-based assets were not relocated abroad to rescue jeopardized parent companies. The following reasons are thought to be decisive:

- Good performance of regulatory bodies, both on behalf of the National Bank of Poland (later referred to as NBP) and the KNF
- Poland was granted a 22 billion USD line of credit by International Monetary Fund, on event of an unexpected turbulence – the line was nonetheless never used
- Although Polish banks are parts of global networks, they usually do not play a part in global transactions made by their parent institutions

1.3. Stylized facts

Typically, after a negative stimulant infects with the economy, the anatomy of a corporate credit crunch, intuitively, reads as follows. Households' spending tends to be lower, due to the emerging risks of unemployment or lowered income. Therefore, firms' diminished investment demand is the aftermath of reduced consumer confidence – corporates are unsure whether they will be able to market their goods or services. Deliberate curbs on borrowing are neither the most probable, nor the most harmful cause of credit crunch. The abridged inclination to borrow may come out of quite severe circumstances, e.g. the deteriorated creditworthiness of an enterprise, which does not allow for a desired amount of credit. The vital part in this framework is played by the accelerators that account for systemic risk. For

instance, as exemplified by Murphy (2009: 101), a ‘forced liquidation of a bankrupt firm's assets may cause losses in fair value for other firms – and losses of confidence in the system as a whole affecting funding’.

In corporate credit, though, demand-side factors are less prevailed, as enterprises are usually interested in acquiring additional liquidity. This is in line with Wdowiński's (2011) finding that increased NPLs decrease the demand for consumer credit, but respective deterioration in corporate credit does not produce analogical reaction of corporates. As a side note, one may reminder that it is usually assumed that the term “credit crunch” is used to describe a contraction of credit, which results solely from supply-side elements. This is in accordance with the definition of Bernanke and Lown (1991: 207), which states that a credit crunch is ‘a significant leftward shift in the supply curve for bank loans, holding constant both the safe real interest rate and the quality of potential borrower’. Consequently, we would have to invent another expression for demand-led credit retrenchment, e.g. aversion to borrow. However, what if the supply curve shifts leftwards for risky loans, but rightwards for good decent opportunities? Conceivably, this is the situation we are witnessing. The set of good credits is limited, though, therefore the cuts are made on the inferior set of subprime exposures. Whatever the definition, Murphy (2009: 283) supplements the credit crunch picture, broadening it by the inclusion of accompanying phenomena: an increase in credit spreads, an increase in risk aversion, and a flight to high quality liquid assets by investors. All of the above is observed in Poland in recent years.

However, according to the Polish Financial Supervision Authority (2010: 13) the demand-led factors were central. The available data concerning the policy of domestic enterprises indicate the reduction of both firms applying for credit (from 38 percent in 2Q 2008 to 19 percent in 2Q 2009), and entities planning to do so (from 36 to 25 percent, respectively). The regulatory body seems to overlook, however, that the reduced demand might be prompted by the increased cost of credit, already known to (or anticipated by) enterprises before submitting an application. Such a mechanism, if valid here, is in fact a grist to the mill of the adverse selection of borrowers. Firms looking forward to implement high-yield, but risky projects, are more likely to apply and receive external financing, than those with less profitable, but safer ventures, which may not allow for an expensive loan. Paradoxically, the latter should be preferred by banks in times of turmoil. But being aware of the asymmetry of information, banks increase not only the interest rates, but also the value of required collateral, thus making less endowed firms still more worse-off and deprived.

Concurrently, supply-side, regulatory and behavioral components of this stylized model come into action. During the crisis, central banks are more likely to promote austere monetary policy, which leads to the decrease of total money supply. As the interest rates grow and monetary base shrinks, banks are unable to raise as much funds as beforehand. As Stephen Foley (2007) noted bluntly, ‘if access to cheap debt is cut off permanently, it will mean an end to all the activity that has been funded by the cheap debt’. Moreover, banks still need to meet the requirement of Basel II capital adequacy ratio (CAR), which means that the deterioration of assets’ quality demands more capital in place, and accordingly, more cautious lending. What is more, banks, like enterprises, may not be sure about future prosperity, especially if sentiment indices are falling. Furthermore, a “confidence crisis” in the interbank market hampers fundraising capabilities, along with the wholesale funding becoming challenged by fussy providers, sensitive to falls in the credit risk profile of the institutions to which they make these funds available. For instance, Hempell and Sørensen (2010: 21), focusing on the 2007-2009 financial crisis in the euro area, suggest that ‘strains on banks’ liquidity positions and their access to market financing contributed significantly to the slowdown in corporate lending, whereas such effects were not significant prior to the crisis’.

All of the above mentioned leads to the cut-back of financial institutions’ lending activities. However, this wide-ranging landscape needs to be augmented when certain banks are analyzed in micro scale. Explicitly, individual banks characteristics may either amplify or reduce the degree by which a given bank is influenced by external dynamics. These characteristics include: shareholding, employed financing strategy, securities held, and the quality of loan portfolio. Limited data sets, however, will not allow us to pursue such an in-depth approach, but some aggregative components will be employed.

1.4. Stylized hypotheses

In the developed markets the credit contraction was determined by several factors, out of which some are not translatable to the Polish scene. One of them was lack of liquidity. The banks which predominantly happened to encounter this kind of drawback were known to have suffered heavy securitization-related losses and became vulnerable to fearful depositors’ panic, as well as to the disappointment of wholesale funding providers. The credit institutions affected by the crunch were therefore traders of securities backed by subprime mortgages, either their important packagers or biggest investors in them (Economist Intelligence Unit, 2008). This does not apply to Poland.

Neither does the banking sector consolidation, which until recently used to be frequently associated with reduced small business lending. The conventional justification was that the consolidation within the banking industry puts opaque small firms, relying mostly on relationship lending, at a disadvantage, since the “soft” information gets lost during the merger. Confronted with the facts, the most recent results demonstrate some deal of ambiguity, as offsetting external effects may arise following the intensification in volume of M&A transactions. (Berger, Molyneux and Wilson, 2010: 532-541 and 863)

However, the aforementioned argument is somewhat reasonably reinforced by Grodzicki, Hałaj and Żochowski (2010: 18), who prove that large banks in Poland exhibit a tendency to lend less than small banks, and maintain that it might be an aftermath of less aggressive strategies.

There were some economists claiming that the decline in domestic corporate lending was partially understandable as lending volumes in previous years were unsustainably high (Jankowiak, 2008). One may find it hard to digest such an idea, since the financial depth ratio (loans to GDP), what has already been mentioned in one of the previous sections, keeps on indicating quite substantial underdevelopment in relation to the Western Europe. Bratkowski in Bratkowski and Myjak (2009: 8) affirms it is obvious that a year-on-year pace of growth in lending may not persist on the level of 30 percent in the long run, even in the emerging market. A shift was unavoidable. Otherwise, macroeconomic stability would have been endangered. But Bratkowski spots also that a decline in corporate lending induced excessively deep correction. If so, the corporate lending seems to be relatively more sluggish in prosperity and more volatile in downturn, which is sub-optimal from the macroeconomic point of view. In contrast, Haselmann and Wachtel (2009) persuade that banks based in transition states indeed shifted their asset portfolios towards mortgages and consumer credit, but small businesses are still financially constrained in terms of the access to bank lending.

Credit facilities play, or at least should do so, a significant role in accelerating economic growth and achieving convergent lending market size. Having said this, and accepting the importance of the subject, construction of the brake that reduced available credit in 2009 should be discovered and understood. The following sub-chapters are thought to provide a certain deal of theoretical considerations, stylized facts and gut feeling concerning the interactions between the underlying variables, performance of which is thought to be non-negligible for credit institutions.

Some variables typically associated with credit volume, were dropped due to the suspicion of inversed causality (e.g. investments, European Union funds transmission). It does

not mean, though, that the risk of inversed causality has been defeated. In fact it is still here, but the chosen specification of the econometric model will to some extent address this risk.

Let's now check whether they were borrowers whose balance sheets distorted, or the lenders did not have their pockets deep enough, or the monetary and regulatory authorities forged inadequate policies. Note that only the fundamental and theory-consistent variables are dealt with in this chapter, whereas the next one is dedicated to behavioral impacts.

1.4.1. Demand-side determinants

The hypothesis of reduced demand is one of the easiest to put forward, but hardly traceable. If credible, it would also be the most convenient for banks, which would no longer be blamed for decimating the money supply. However, to relieve banks of this burden will not be like waving a magic wand. As stated in the theoretical considerations, it is usually assumed that corporations are always willing to absorb every amount of credit made available to them. There are serious caveats of whether demand-side factors coerced the contraction of corporate credit.

An advanced level of scrutiny and skepticism is indispensable while debating the demand-side determinants. First, only effective demand, i.e. the demand which is underpinned by appropriately convincing financial standing and creditworthiness, should be taken under consideration. Second, the corporate credit is not a homogenous good. The drivers for short-term and long-term, investment and operating, corporate and small business loans are highly different. Third, customer preferences, with regard to the sources of liabilities, are dynamic and may be correlated not only with the respective funding costs, but also with the type of desired credit. Complying with all of the above criteria is hardly possible, due to numerous problems in measurement. Therefore, as far as the demand-side is concerned, the researcher is doomed to use inevitably flawed proxies. As a result, a certain portion of the demand-side investigation is made within the third chapter.

Hypothesis 1. Borrowers flew to foreign markets

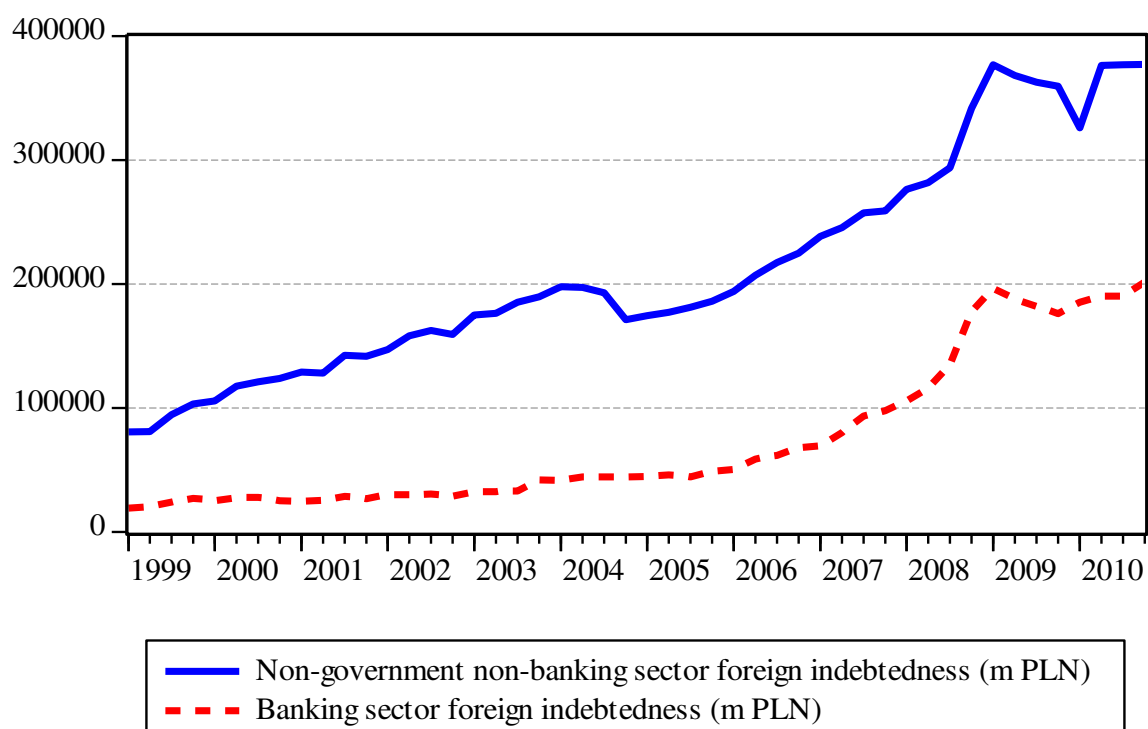
While the companies were unable to meet stricter banks' criteria, and terms and conditions of credit, they might try a chance abroad. The question is whether the declined availability of credit on the domestic market was a sufficient stimulus to search for borrowing opportunities in a foreign country. Moreover, as most of the developed economies have been

hit harder than Poland, it remains highly doubtful that circumstances abroad were more favorable for Polish firms as compared to domestic ones. The final caveat with regard to this hypothesis is that foreign funding was in major part only available to corporations, leaving small and medium-sized enterprises' needs unmet.

It is evident that until mid-2008 the expansion of borrowing abroad was more dynamic than borrowing domestically. However, this previously uninterrupted growth had lost its momentum even before the first signs of domestic crunch became noticeable. This is most likely the consequence of the fact that the crisis had already been omnipresent in the developed economies by that time. However, a declining trend was not formed and Polish agents continued to borrow abroad, however, almost perfect interchangeability is seen with regard to domestic and foreign borrowing in the short run. If domestic credit is less accessible, foreign lending makes up for this, otherwise the opposite holds. Nevertheless, there are too few details to determine the factual interconnection of these two variables, especially because of the following data set inefficiencies:

- Quarterly reporting, instead of monthly
- No break-down with regard to type of agent (corporation, SME, others)
- No break-down with regard to the purpose of the loan (investments, trade)
- No break-down with regard to the maturity of the loan (short or long term).

The chart below seems to ultimately undermine the proposed hypothesis. Foreign indebtedness in the non-government non-banking sector has been on constant, rather uninterrupted growth since 1999. In 2008, when corporate lending fared still pretty well in Poland, foreign debt surprisingly skyrocketed, too. But the volume of foreign debt failed to grow even slightly in 2009 and 2010. Fluctuations that happened in this period are probably a derivative of tempestuous behavior of currency exchange rates, following the depreciation of zloty. To sum up, corporate lending from non-residents is undeniably more parallel than counter-cyclical to the domestic corporate lending volumes.



Source: National Bank of Poland.

Figure 5. Foreign indebtedness in the non-government non-banking sector, as compared with the banking sector (for comparison purposes).

Hypothesis 2. Borrowers took advantage of alternative sources of capital

The hypothesis that enterprises abandoned bank credit to the advantage of alternative funding is fragile, identically as the previous one. Corporate bonds, mezzanine, leasing, initial public offering, private equity or venture capital, business angels, European Union's funds and trade credit – all of these are possible substitutes. As the interplay between corporate lending and the above mentioned surrogates has not been frequently researched by scholars, some sort of a *Gedankenexperiment* will be useful before proceeding to the further exploration on this subject.

First, a domestic credit crunch in Poland is not likely to make a positive shift in a venture capital or private equity cycles. Although there is some weak evidence on that in the United States (Richtel, 2007; Gardner, 2008), this may not be directly transferred to the domestic market, which is roughly thousand times smaller than overseas. But regardless of geographical location, only relatively few cutting-edge start-ups or early stage companies may benefit from VC funding. By the same token, it will apply to other forms of high risk capital.

Second, the observable growth of EU-financed investment projects may not be a valid cause for domestic credit contraction. In fact, it should be rather more supportive than destructive to corporate lending, since the EU most often co-finances only a portion of the accepted projects' required funding. The remainder has to be covered by an applicant, which, induces further lending. Such initiatives are somewhat a blessing for a bank, since they are considered safer (Szymborska-Sutton, 2011).

Third, there is no evidence that the credit crunch encourages firms to go public. This is also a fairly intuitive inference, as company's valuation during the uncertainty in the global marketplace is not as appealing as it would have been during the prosperity. There were 24 market debuts at the Warsaw Stock Exchange (WSE) in 2007, 61 in 2008, and only 26 in 2009. In 2010, though, a record-breaker of 86 has been achieved. Nevertheless, in the year of the deepest crunch only 26 companies went public, which rather does not support the hypothesis of increased fundraising on the stock exchange. Moreover, the table below suggests that, on the one hand, the ratio of market capitalization to nominal gross domestic product (GDP) in Poland in 2008 still underperformed in comparison with the developed economies and, on the other hand, even an increased volume of debuts may still be attributed to the catch-up effect. What is more, the stock exchange is still considerably posh and exclusive. The smallest companies are generally unable to tap capital markets, although some of them may carry out a public offering through a recently opened, WSE-owned, alternative and more inclusive trading system called New Connect.

Table 1. Market capitalization of EU27 Member States, Russian Federation and Turkey, as a percentage of nominal GDP in 2008

	Country	Market value of publicly traded shares (31 Dec 2008) in m USD	Nominal GDP (2008) in m USD	Market capitalization to nominal GDP (percentage)
1	Luxembourg	66,460	57,639	115.30
2	Russian Federation	1,322,000	1,666,951	79.31
3	United Kingdom	1,852,000	2,662,652	69.55
4	Spain	946,100	1,594,466	59.34
5	Finland	154,400	270,479	57.08
6	France	1,492,000	2,854,229	52.27
7	Sweden	252,500	487,576	51.79
8	Malta	3,572	7,449	47.96
9	Netherlands	387,900	872,865	44.44
10	Slovenia	22,100	54,395	40.63
11	Denmark	131,500	340,801	38.59

12	Belgium	167,400	505,374	33.12
13	Cyprus	7,955	24,910	31.93
14	Germany	1,108,000	3,634,526	30.49
15	Portugal	68,710	251,833	27.28
16	Greece	90,400	350,300	25.81
17	Ireland	61,700	266,329	23.17
18	Italy	520,900	2,296,629	22.68
19	Czech Republic	48,850	216,084	22.61
20	Austria	72,300	414,671	17.44
21	Bulgaria	8,858	51,825	17.09
22	Poland	90,230	528,324	17.08
23	Turkey	117,900	730,337	16.14
24	Hungary	18,580	154,668	12.01
25	Romania	19,920	200,071	9.96
26	Estonia	1,950	23,517	8.29
27	Lithuania	3,625	47,129	7.69
28	Slovakia	5,079	98,464	5.16
29	Latvia	1,609	33,849	4.75

Source: Central Intelligence Agency, World Bank.

Fourth, yearly reports on Poland's leasing market (Polish Leasing Association, 2010) indicate that, in terms of proportions, the decline in business was even profounder in some sectors than the slump in bank corporate lending. However, the initial recovery took place yet in 4Q 2009, and since leasing volumes are sometimes considered as a leading indicator of the economic performance, it is fairly optimistic. Leasing was thus a likely remedy for some enterprises, alleviating their troublesome access to liquidity. Still limited adoption of this source of funding in Poland precludes us, though, from using this variable in further research, because its macro impact is expected to be negligible.

Fifth, although a number of commentators claimed the remarkable growth of corporate bonds market, it is available only for biggest players, able to offer investors a considerable stock of bonds. While some corporations could afford corporate bonds issuance, the remaining 99 percent of the Polish firms might, at the most, approach a knee-breaking loan shark from just round the corner.

Consequently, in most cases SMEs can do little to combat the crunch and are likely to be smashed disproportionately hard during the contraction. As noted by Berger, Molyneux and Wilson (2010: 531), 'small businesses are engines of growth in the modern economy', but it is bank lending which 'provides much of the fuel for this growth'. This finding is generally in line with Havrylchuk (2005: 62), maintaining that 'market finance is unavailable to majority of companies'. So are cross-border lending and inter-company loans, available only to blue

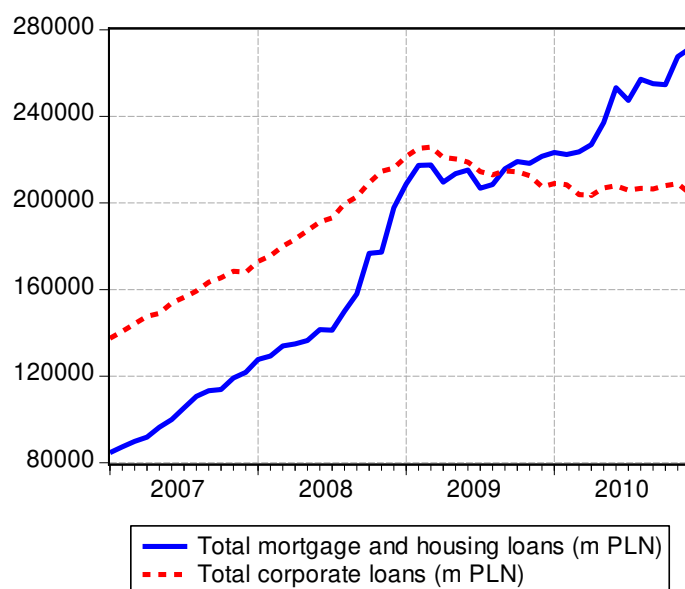
chips or companies with foreign direct investments, respectively. Greater bank-dependency of SMEs is confirmed also by Wdowiński (2011: 3). In conclusion, shift of lending preferences was the case, but its scale and impact had to be meager.

1.4.2. Supply-side determinants

Hypothesis 3. Banks were restructuring their portfolios

Switching to more secure types of credit and reinforcing one's market position in the safer segments clearly seem to be the mainstream survival strategies of Polish banks. Although the shares of consumer loans and other loans did not significantly change, housing loans quite fast overweighed corporate ones. Mortgages were considered less risky. True, consumer loans proved to be even riskier than SME lending, but the risk premium remained disproportionately high. Therefore, banks still did not have sufficient incentives to reduce their exposure for cash loans.

The incredible pace of the underlying switch poses a threat that estimations utilizing this time series will fail to capture this effect, since previously for many years, both types of credit exhibited positive collinearity.



Source: National Bank of Poland.

Figure 6. Total outstanding amount of mortgage and housing loans, as compared with total outstanding amount of corporate loans.

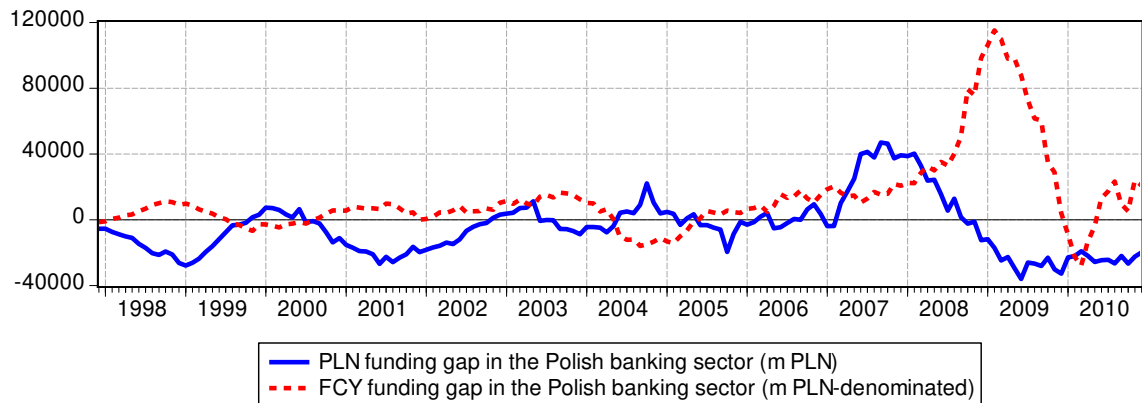
Hypothesis 4. Boosting impaired loans ratios treated as a red flag

Impaired loans ratio skyrocketed, causing much distress among banking sector. It was probably a red flag for banks to pull the emergency brake. On the one hand, non-performing loans share (NPL) doubled between October 2008 and May 2010 (however, in the meantime, methodology has been slightly changed by the National Bank of Poland). On the other hand, the ratio used to be even more alarming in the earlier years. However, if we assume the existence of adaptive expectations, imposing a pressure on low NPL levels, this variable may still be significant at least in the short term. The importance of this factor is confirmed by many scholars, including Wdowiński (2011: 7).

The question is whether only corporate NPLs mattered. Richard Mbewe (2009) utters that irresponsible consumers are to blame. According to him, the credit crunch was stirred by individuals not able to service their own cash loans, and thus undermining their creditors' positions. Although it is certain that banks suffer from over-indebtedness of individuals, it is also true that a direct link between the corporate lending volume and the quality of consumer lending portfolio is not so straightforwardly explainable.

Hypothesis 5. A shortfall in deposits reduced money supply

Most national regulators broadened deposit insurance providing safety net for individuals, guaranteed banks' borrowing and injected debt or equity capital into leading banks. In Poland, just the first one of the above mentioned measures was enacted. But even if it had not been the case, the pertaining hypothesis would have seemed rather implausible, as the Polish banking sector is known for its tight spot concerning excess liquidity. Even a reasonable decrease in money supply might turn out to be immaterial to the banks' lending committees. Research, and now also the evidence, show that even under excess cash, increased lending may not be taken for granted. For instance, despite unprecedented monetary stimulus, the flow of credit in the United States remained constrained. Artificially improved, but decent fundamentals have been beleaguered by hoarding instincts of major American banks. As summarized by Henry (2010), a steady decline in the ratio of cash to business loans – from around 60 percent in the 1970s to a low of 20 percent in late 2008 – has reversed sharply over the 2009. According to Federal Reserve data, banks squirreled away an all-time high of 98 cents in cash for every dollar of existing corporate loans during the week of January 13th.



Source: National Bank of Poland.

Figure 7. The funding gap is defined here as the result of a subtraction: (total receivables from the non-financial sector minus total receivables from the non-financial sector 12 months ago) minus (total liabilities to the non-financial sector minus total liabilities to the non-financial sector 12 months ago). In short, the output describes how much faster is the growth in lending, as compared with the growth in deposits, in nominal terms.

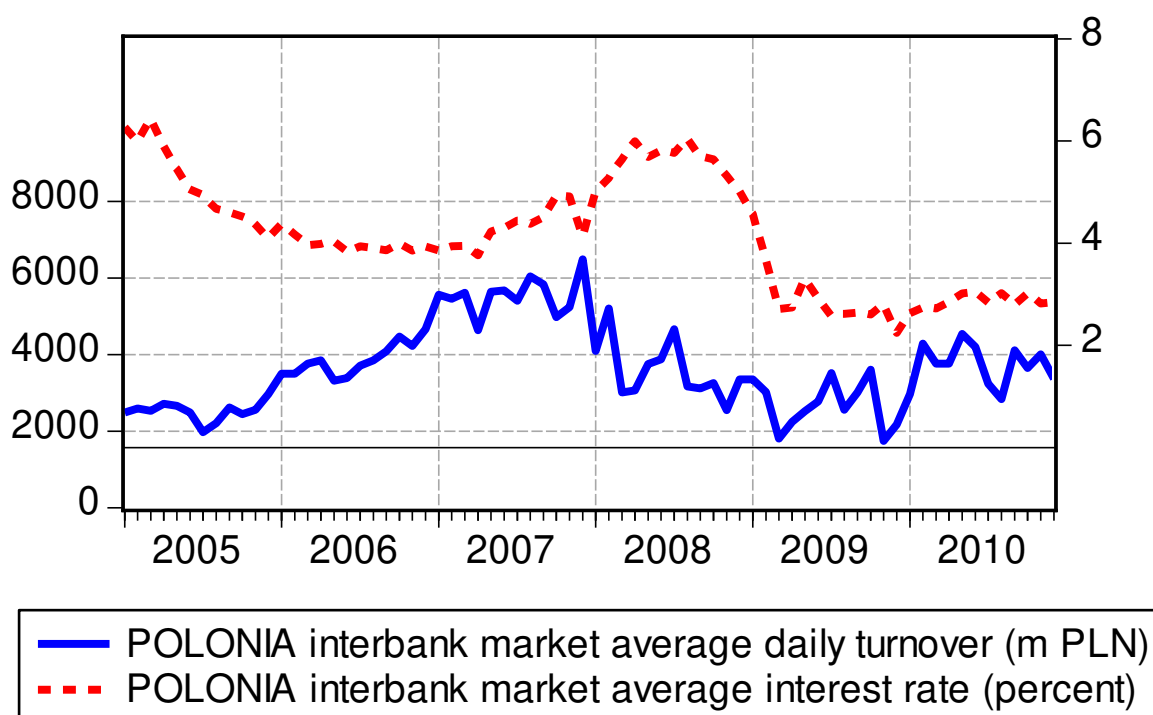
The above chart proves that funding gap as regards the Polish zloty, increased considerably throughout 2007, which supposedly may determine banks' reluctance to lend in the next years. Probably the one valuable finding that transpires here is the shrinking rate of growth in lending in 2008. Although we are far from considering 2008 as the year of crunch, it must be admitted that some vital force has been pulling the lending down. As soon as the problem is realized, the solution is found. This was reinforced currency lending which made up for all that difference. The foreign currencies' funding gap turned negative in 2009, which means a truly sharp decline, since the deposits in foreign currencies were scarce, while the lending in foreign currencies skyrocketed.

Hypothesis 6. Crisis of confidence in the interbank market

Banks lend and borrow liquid reserves kept on their current accounts in the central banks. They consist of obligatory reserves and the assets accrued voluntarily. This is why the market enables liquid credit institutions to lend their funds to banks that struggle to make ends meet. The interest rate (Warsaw Interbank Borrowing rate, WIBOR) is determined by supply and demand. This cost of funding has increased rapidly in 2008, i.e. much before the contraction became visible in the data sets. In the effect, interbank market came to a halt, as

the turnout has fallen down from nearly 6,5 billion PLN at the end of 2007 to less than 2 billion PLN at the beginning of 2009.

This mechanism was skillfully depicted by Murphy (2009: 105). Knowing that liquidity directly affects repo funding and that repos are only a safe form of lending if the lender can be sure that the collateral is reliable, if the collateral becomes illiquid, then it is hard to value. It is hard to be confident that the loan is fully collateralized. The author punchlines that interbank repo funding therefore tends to dry up when bond liquidity falls. In the Polish case, a pure supposition that the other banks' assets may be somehow contaminated sufficed. Referring to Szpunar (2010: 9), surplus liquidity in the Polish financial sector exists, but it is 'concentrated in a small group of banks' and its re-distribution through the interbank market is vital.



Source: National Bank of Poland.

Figure 8. The dynamics of interbank market captured by interest rate and turnover.

POLONIA is calculated as an average weighted of the rates and amounts of transactions provided by the market players. It currently covers up to 57 percent of the concluded interbank transactions and constitutes a valuable source of information underlying the NBP's policy on domestic operations. The recurring inference, flowing from this figure, consistent with the previous one on funding gap, is that 2008 was a crucial period, in which fundamental

deteriorations in the system should be detected. An immense slump in interbank trade happened in 2008, whereas the consecutive years mark its slow but persistent reconstruction, supported by the low interest rate environment.

Richard Mbewe (2009) says that banks may have ‘a desire to accumulate as much cash as possible in order to be well positioned when the market thrives’. This would be quite innovative premise, indicating that neither austerity nor risk aversion placed the most sinister stamp on banks’ low-key policies, but instead of it, lucid business calculations were in place.

The analogous behavior occurred even in the United States. A combination of weak demand from borrowers and risk aversion from lenders is to blame. In particular, banks are building cash buffers in anticipation of stringent new rules on reserve requirements, leverage ratios and the like. Annual growth in the balance of existing business loans has fallen for eight consecutive months. The credit crunch is far from over.

Münchau (2009) indicates that banks were vigilant, because they knew their own positions. Thus, they suspected other banks were in the same trouble, or even worse. Despite abounding liquidity in the system, a funding impasse emerged. Brunnermeier (2009: 95) has no doubts on that: ‘the troubles in the interbank lending market in 2007–2008 are a textbook example of precautionary hoarding by individual banks’. It was due to skyrocketing uncertainty about own funding needs and the vagueness of whether the interbank market would give a hand in troubles or not.

1.4.3. Impediments related to monetary policy and regulations

In his exhaustive publication, Jean-Charles Rochet (2007) argues that banking crises are largely amplified, or even provoked, by political interference. If he had completed his work after the breakout of the current worldwide crisis, he would probably have had additional evidence to elaborate on his standpoint to make it even more convincing. Nevertheless, this causation again seems to be rather irrelevant in the domestic case, at least in the realm of corporate credit. With hindsight, this assessment is relatively easy, but in the gloomy beginnings of 2009 it was not that obvious. Back then, CEOs of two biggest Polish banks, PKO BP and Pekao SA, stood up in joint effort to extort relaxation in monetary measures from the NBP (Warsaw Voice, 2009). Having developed bleak scenario for 2009, Jerzy Pruski and Jan Krzysztof Bielecki discredited the effectiveness of rate cuts and short-term liquidity measures, and offered new medicines designed to mitigate the credit crunch risk. They insisted that the central bank should:

- Cut mandatory reserves (reserves requirement rate) from 3.5 percent to 2 percent
- Buy back bonds set to mature in 2012
- Accept new forms of collateral from commercial banks, including credit liabilities.

In this context, as the above mentioned demands have not come into force in the proposed form, one must admit that even if the monetary and regulatory measures were not contractionary, they were also not carelessly expansionary. Let's make a short round-up of the NBP's, KNF's and government-led deeds that could potentially sway corporate lending.

Hypothesis 7. Contractionary monetary policy

Challenged by the crisis, central banks all over the affected area found themselves between a rock and a hard place. On the one hand, expansionary measures might sustain growth, but might also propagate the risk on yet stretched financial markets. On the other hand, macroprudential steps might ensure security, but at the cost of aggravated crunch. However, the facts indicate that the current central banks' orthodoxy is rather to cut rates to ludicrously low levels, whenever the economy goes into trouble. This time it might not be that straightforward, provided that the experts' outlooks about what potential damages the global crisis would cause were discordant. According to Furceri and Zdzienicka (2011: 20), there is no single recommendation for the developing countries' monetary policy in crisis. 'Some economists advocate an increase in interest rates to defend the domestic currency and attract foreign capital back into the country, whereas others encourage the opposite action to stimulate the economy'. In Poland, judging by interest rate policy, the central bank did what it took to avoid reduced money supply and credit availability.

The credit channel mechanism of monetary policy describes the theory that monetary authority's policy changes affect both the issuance of credit to borrowers as well as credit availability from lenders, which in turn affects the real economy.

The traditional framework educates that monetary policy influences the economy exclusively through the interest rate channel. Restrictive monetary policy increases the cost of capital, thus reducing firms' investment activity and consumers' spending, which consequently reduces aggregate demand and the inflationary pressure. However, such an approach is not comprehensive any more. The credit channel is viewed as an indirect amplification mechanism that works in tandem with the conventional monetary policy transmission mechanism. The credit channel view holds that monetary policy adjustments that affect the short-term interest rate are amplified by affecting the cost of raising additional

capital by banks (see Łyziak, 2001: 4). Wdowiński (2011: 6) also suggests that the lending channel rather supplements the conventional mode of monetary transmission rather than represents itself an independent mechanism. The bank lending channel theorizes that changes in monetary policy will shift the supply of intermediated credit. If the supply of loanable funds banks possess is affected for some reason, then so too should be the borrowers who are dependent on banks' funds for business operations.

It has been widely accepted that constraints on the wholesale funding of bank balance sheets amplify the transmission of monetary policy through the lending channel. Although the strength and the speed of adjustment of different economic variables to policy makers' decisions remain vague and country-specific, lending channel hypothesis may not be dropped in this analysis. Proponents of the existence of the bank lending channel argue that it is efficient provided that at least some banks are liquidity constrained. 'Following a reduction in reserves and bank deposits, constrained banks are unable to substitute wholesale market funding for lost reservable deposits and so must reduce their lending by more than unconstrained banks' (Milne and Wood, 2009: 7). This may later spill-over if the liquidity constrained banks are the source of capital also for other lending institutions. All in all, with the bank lending channel, the contraction in credit is larger than with the conventional interest rate channel alone.

According to another reasoning, a contractionary shift in monetary policy increases external premium (e.g. through the increased collateral valuation), alters the cost of credit and, consequently, real expenditures, thus amplifying the interest rate signal (Bernanke and Gertler: 1995). If so, even an excess of monetary stringency would not be one-sidedly harmful for borrowers.

The logic of the Polish banking sector cast doubts on the efficiency of bank lending channel. Since the level of internationalization within the sector is considerable, the National Bank of Poland has only limited influence on the lending institutions policies.

Ewa Wróbel in Grabek et al. (2008) states that the adjustment of Polish banks' interest rates to market interest rates is sluggish and incomplete, due to imperfect competition (banks are "price makers" rather than "price takers"), menu costs and uncertainty with regard to the durability of current central bank's stance. Pietrzyk (2005: 4) takes a step further, by saying that the lending channel in Poland virtually does not exist due to the excess liquidity prevailing in the domestic banking sector. Even the increased purchase of government bonds will not reduce the bank's liquidity to an extent which would lead to the reduction in credit issuance in that bank. The author argues that it is real economy, i.e. overall prosperity,

enterprises' financial standing or non-performing loans ratio, which impact bank lending policies.

As for corporate loans, an empirical study in Poland for the period 1995-2006 indicates that the adjustment took place very fast (one month and a half) and was full. Chmielewski (2004) points out that the source of differences in speed of interest rate adjustments lay in banks' individual characteristics. His findings are that the banks with loan portfolios of lower quality, as well as those with lower capital adequacy ratios, happen to adjust corporate interest rates faster and stronger than the banks with less risky portfolios or healthier capital structure.

Schmitz (2004: 26) insisted to revise the usual assumptions taken in the literature, that a small, less liquid or less capitalized bank reacts more strongly to the monetary policy change than a bank with a high value of the respective bank characteristic. Furthermore, affiliated banks or foreign-owned banks should show a weaker reaction to restrictive monetary policy since they can access internal or foreign capital markets. Indeed, controlling for the banks' ownership structure is crucial for understanding whether the monetary policy is efficient or deficient in a particular case. The banking sector in the EU new member countries can be subdivided into two groups along the ownership structure. In particular the group of foreign-owned banks adjusts more strongly their lending after an increase in euro area interest rates than their domestic-owned competitors. Apart from it, most of other bank characteristics demonstrate insignificant statistics or yields significant but only weak response.

Besides, Milne (2009: 35) puts another issue under consideration. It has been widely accepted that constraints on the wholesale funding of bank balance sheets strengthen the transmission of monetary policy. In fact it is ambiguous, with an amplifying effect only when a tightening of monetary policy leads to a net outflow of funds, i.e. deposit outflow exceeding the decline of lending, in constrained banks. Otherwise the bank lending channel attenuates the impact of monetary policy.

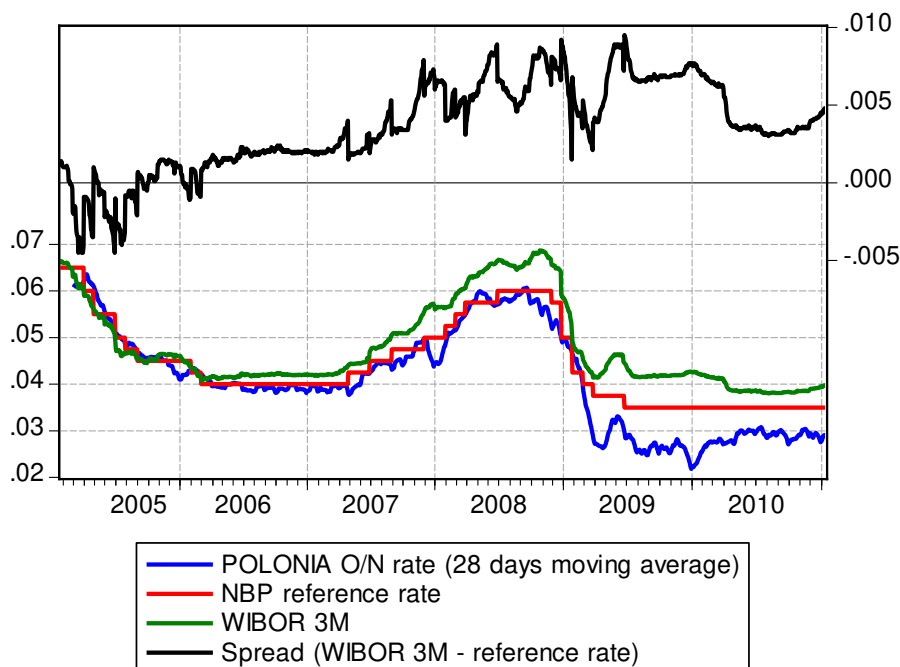
The most recent broad-based empirical study by Gambacorta and Marques-Ibanez (2010) claims, rightly, that 'the whole monetary transmission mechanism has changed as a result of deregulation, financial innovation and increasing role of institutional investors'. Changing business models and the intense use of securitization as a funding asset, call for revisiting the way in which the lending channel works. This is a justified statement, but under Polish conditions such financial innovations did not have a decisive impact.

The very hypothesis that a central bank forged a contractionary policy is highly disputable. It seems that this time central banks all over the world orchestrated growth-oriented maneuvers. When the crisis broke out, central bankers anticipated that the most vital

challenge is to protect the real economy from shortage of credit. As interbank market died out because of trust deficit, the availability of credit slumped and might fuel a domino effect. Central banks intervened to provide liquidity, seeing that the interbank market had malformed.

Although in the Polish sector these phenomena did not show up with such intensity, it exhibits a general trend followed by central banks these days. If so, one may ask adversely: have excessively low interest rates preceded the credit bubbles and caused a crunch? The judicious answer is: true, monetary policy stance is a plausible candidate to blame, but this simple time coincidence is not yet a proof. No one may assure that the property bubble, which underlay the meltdown, would not have happened, if interest rates had been set higher.

The bank lending channel is not the only issue applicable when discussing the monetary policy impact. The financial authorities were sometimes criticized for failing to harmonize various interest rates in the market. Anna Zielińska-Głębocka, a member of the Monetary Policy Council (RPP) underlines the fact that since liquidity in the Polish banking sector is already vast, high interest rates on loans and clogged lending channel descend purely from the risk assessment made by banks (Chądzyński and Zielińska-Głębocka, 2010). According to her, it should KNF's focal point to take care of banks' simultaneous ability to meet regulatory criteria and revive credit availability.



Source: National Bank of Poland, money.pl.

Figure 9. Various interest rates, prevalent in the Polish financial sector from January 2005 to January 2011, indicating the growing discrepancy between the market interest rate and the official NBP-quoted rate.

The above graph shows that yet in the end of 2007 spreads became unusually high, which means that the cost of credits had to go up too. However, the highest average spread falls on 2009. Then, POLONIA rate for overnight deposits dropped abnormally low, which has additionally shaken the state of equilibrium. It has to be underlined that POLONIA is purely factual (ex post) interest rate under which real transactions have been concluded, while WIBOR is just theoretical price (ex ante), not entailing the fact that any trade has been made under this quotation. This additionally authenticates the inference about the enormity of spread, which leads to the conclusion that credits were sold at a very expensive price. In response to it, the NBP has recently placed a commitment to keep volatile POLONIA rates closer to the reference rate, which would be convenient for market players (Wilkowicz, 2011b).

Another possible measure influencing banks' behavior is the reserve requirement rate. Central bank is very cautious and reluctant to alter it, as it is believed to be overpoweringly efficient. This rate has been remaining unchanged for almost seven years, since the national bank decided to lower it. It was reestablished at 3.50 percent at the beginning of 2011. It is also potentially worthwhile to mention that many researchers underline the existence of yet another pass-through channel by which monetary policy may moderately influence. It is a risk-taking channel, first defined by Borio and Zhu (2008), indicating that banks are willing to take on more risk, even not being compensated by the increased risk premium. This concept is supply driven and is believed to explain differences in banks' responses to monetary policy shocks, provided that banks' portfolios of customers are similar. The risk-taking channel is confirmed e.g. by Buch, Eickmeier and Prieto (2011) and in Poland by Grodzicki, Hałaj and Żochowski (2010). In fact, the exploration of this field is still nascent and Polish crunch-related experience exhibits rather weak, if any, influence of the risk-taking channel.

Hypothesis 8. Measures taken by the financial supervision

Polish Financial Supervision Authority has undertaken some measures with regard to excess indebtedness – however, they all concerned household credits and were introduced already after the biggest damage had occurred. Recommendations brand-named “S” and “T” have meant to be a response to a global crisis, adjusted to the patterns of behavior of the Polish banking industry. The regulations are evaluated ambiguously. Recommendation “T”

endorses how to calculate the maximum available credit for an individual and which stress tests to apply. Recommendation “S” provides best practices on housing loans and mortgages.

Corporate lending was apparently not an issue worth exploring by the KNF.

1.4.4. Other external factors

Hypothesis 9. Foreign-based parent banks asked to cease lending

Among claims emphasizing the decisive role of risk aversion in contraction, Jarosław Myjak, Deputy Chairman of blue chip PKO BP, responsible for corporate banking, admitted that fundamental issues were overall to a certain extent meaningful. In a press interview (Wilkowicz, 2009) he disclosed that some banks had been striving to dispose of assets in order to augment their capital adequacy ratios – not only for their own, but also at the level of pertinent international group. This worked like a hand brake, and consequently impeded lending activity. As soon as in November 2008 other analysts also raised concerns about the capital structure of the Polish banking sector. Stefan Kawalec (2008) persuaded that Poland is threatened with a sudden slowdown of credit flow. He made it clear that the threat stems from the fact that two thirds of Polish banks’ assets belong to international banking groups with headquarters in countries situated at the heart of the crisis. These banks were expected to shut down their foreign operations as a response to the financial distress. Among the empirical studies I managed to get acquainted with, one confirms the risk that under the unfavorable conditions, non-domestic credit institutions freeze their lending operations. Chmielewski’s (2006) model demonstrates that banks with a larger share of foreign equity tend to lend less after a monetary contraction. The author attributes this effect to weaker lending relationships with the clients or a more conservative approach which comes out of an unfinished process of acquiring the local knowledge. The latter is no longer a plausible contemplation, as most of the foreign banks operating in Poland now have surely managed to boost their market expertise significantly, as opposed to the 1997-2004 sample, which was scrutinized by Chmielewski.

But here the KNF decided to employ a repelling strategy, and warned foreign affiliates, that any attempt to transfer disproportionately high portion of profit abroad, will result in counteractions forged by the KNF. Apart from dividend, foreign mother banks had limited opportunities to grab the Polish banks’ earnings. The Commission threatened to sue the parent banks under a very strict, somewhat a catch-22 article saying about “malpractice detrimental

to the company”. However, such „malpractices” are not at all marvels in the financial markets. For instance, although HSBC made huge writedowns in their core markets during the crisis, it was able to absorb them and balance them with its booming emerging-markets activities (Economist Intelligence Unit, 2009).

How could such a mechanism work? Polish bank may open a deposit in its parent company. Although this is not considered to be a transfer of funds, the deposit practically injects money into the parent bank. However, this kind of financial operation is easily detectable by financial supervision authorities. In order to prevent it efficiently, the KNF soon after the breakout of the crisis, demanded a day-to-day reporting from Polish banks, e.g. on this type of operations. There are obviously more sophisticated measures, with which it is possible to pass by the watchdog. According to specialists, supervisory bodies have very limited resources to detect such walk-around steps. Even if this is rarely the case in Poland, not the mercy of foreign investors is responsible for that, but the very fact that resources being at the disposal of Polish banks are minor as compared with the needs of the financial world, stuck deep in the upheaval (Grzyb, 2008).

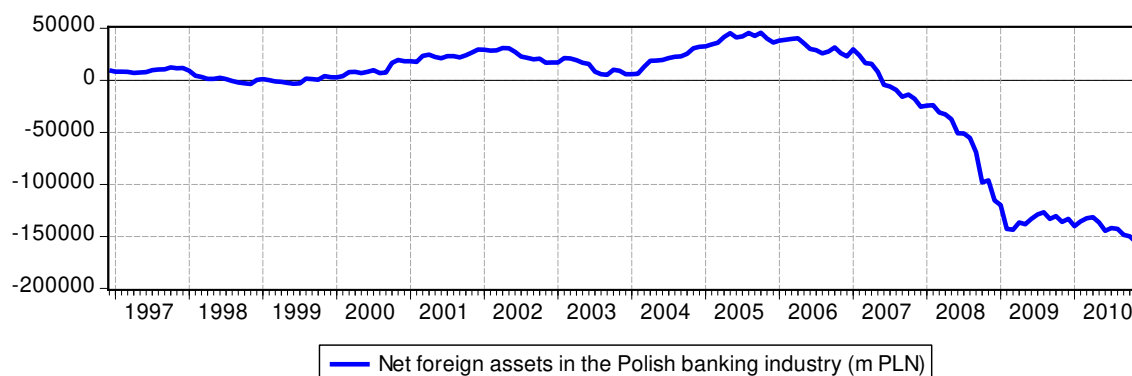
KNF’s data reveal clearly that Polish banking industry’s funds invested abroad dropped in 2008 by 13,8 billion PLN. In the meantime, substantial foreign inflow was observed (foreign credits and loans, and foreign deposits), amounting to 84,5 billion PLN. It means that the exposition of Polish banks for foreign risk decreased. Contrary to the fears espoused by some, these were foreign institutions which substantially increase their engagement in Poland (Iskra, 2009). As a matter of fact, we may not infer about the purpose of the money flows. Along with higher volumes of foreign assets, the amount of foreign liabilities has also been sharply rising. The intention might be to stimulate lending activity, but more probably the bulk of money from abroad was designed to take advantage of higher interest rates in Poland.

Given the shortage and poor frequency of reporting, broken-down by fundraising strategy, an in-depth analysis would not be reliable. Decomposing the foreign inflow by type of bank that received it, reveals the following dynamics of liabilities to non-resident institutions rose:

- from 5.18 to 9.19 percent, in banks applying deposit strategy
- from 65.27 to 74.82 percent, in banks applying foreign funding strategy
- from 17.28 to 27.21 percent, in banks applying mixed strategy

In sheer numbers, liabilities to non-resident institutions in that period almost doubled, from PLN 68.81 bn to PLN 128.28 bn. But according to Bratkowski and Myjak (2009: 5-6), banks applying deposit strategy have a 60 percent share in total assets within Polish banking

industry. And regardless of the turmoil, deposits continually overwhelmed credit and, from the point of view of liquidity, no real risk existed. Only less than 10 percent of assets are owned by banks, which gather funding abroad from the parent companies. As a stylized fact, we may infer that those who pursued mixed strategy faced relatively toughest problems. Their primary source of liquidity was the domestic interbank market, which died out, while foreign players could not exhibit a forceful commitment to compensate for it. These banks played aggressively in terms of customer deposits acquisition, thus initiating a spike in cost of credit.



Source: National Bank of Poland.

Figure 10. Net foreign assets in the Polish banking industry. Negatives indicate that the outflows are overwhelmed by inflows, thus the foreign-based institutions provide liquidity to their affiliates in Poland.

CHAPTER II

LITERATURE SURVEY AND DATA ANALYSIS

2.1. Literature review

As the subject matter covered by this thesis is relatively recent and the market put under investigation is still quite remote from anywhere adjacent to the hearts of financial markets, there is certainly insufficient scientific coverage of latest developments. This is why a certain amount of literature are press articles and commercial reports. Their presence in the bibliography is also crucial for the sake of qualitative assessment of behavioral aspects that might have drawn the crediting down. The summaries below are intended to delineate the theoretical concepts that surround corporate lending, although not all of them directly affect Poland's market players at the current stage of the domestic market landscape.

The most recent econometric paper devoted to crediting in Poland is that of Wdowiński (2011), with the newest observations dated 2Q 2010. His findings generally indicate that corporate credit is considerably inert. Its volume reacts weakly in response to the analyzed regressors. The increase of banks' margin on relevant type of loans by 1 percentage point decreases the volume of commercial credit by 1 percent within the consecutive four years (as compared to 4 percent for mortgages and consumer loans). Even the boosting NPL ratio, while deteriorating by 10 percent, induces only a 4 percent slump in corporate credit throughout the respective period (up to 10 percent for mortgages and 5 percent for consumer loans). Unsurprisingly, the increase of central bank's reference rate by 1 percentage point also hinders corporate lending to a smallest degree: up to 2.5 percent fall (5 percent for mortgages and 4 percent for consumer loans).

While Wdowiński investigates the determinants of credit, Brzoza-Brzezina and Makarski (2010) have undertaken the effort to assess the role played by the banking sector in transmitting the slowdown, i.e. to what extent the recent financial sector disturbances affected national accounts in Poland. The researchers pinpoint that the domestic standstill was intensified by the restrictive behavior of banks, which increased the cost of borrowing and tightened conditions of lending. Moreover, they note that, similarly to other small open economies, Polish credit institutions were 'driven by external rather than internal factors' (2010: 10). Seeing the balanced situation domestically, one must look at worldwide crisis of confidence to understand what reduced the volume of transactions and raised spreads. Being

truly convinced of the validity of their arguments, Brzoza-Brzezina and Makarski (2010: 21) consider financial sector disturbances as exogenous in their econometric model. What they have found out is that the macroeconomic impact of the crunch is ‘substantial though not overwhelming’, as banking sector shocks could explain 1.5 percent of the decline in GDP, as compared with approximately 2 percent explained by the recession in the EU (2010: 38-39).

Considerable amount of literature was researched while elaborating the lending channel theory impact. Bernanke and Blinder (1988) were the first ones who defined what is now known as the bank lending channel, pointing out that the monetary policy can influence not only the demand for bank loans, but the supply as well. The paper of Matousek and Sarantis (2007) is particularly valuable source of considerations referring to monetary transmission mechanism, as it focuses on the Central and Eastern European (CEE) countries that joined the European Union in May 2004. The empirical results, performed on a large panel of disaggregate data for individual banks, have shown that there is a significant bank lending channel in all CEE states, though the strength of it varies across countries. The authors’ initial assumptions indicated that most sensitive to monetary policy shocks are:

- Small banks, which have limited access to wholesale funding
- Less liquid banks, which cannot insulate their loan portfolios by reducing their liquid assets
- Poorly capitalized banks, due to their limited ability to tap into uninsured (non-deposit) sources of funds.

Looking at the model’s results more closely, with each bank’s explanatory characteristic for monetary transmission isolated from the others:

- Bank size is significant but has a negative sign in Poland, which is inconsistent with the theory; within the complete model, bank size becomes significant in all countries, but negative sign for Poland remains
- Liquidity has the anticipated positive effect in all countries except Poland
- Capitalization shows the significant positive coefficient only for Poland; overall, the evidence suggests that capitalization is not as important in distinguishing banks’ reactions to changes in the stance of monetary policy.

As it may be derived from the above, Poland seems to be considerably peculiar on its lending channel performance and it is actually difficult to decipher what are accelerators and inhibitors for the internalization of monetary policy by Polish banks.

Bijapur (2010) in his paper entitled “Does monetary policy lose effectiveness during a credit crunch?”, comes up with a positive answer. He tests whether ‘the impact of cuts in policy rates on GDP growth has been more muted during episodes of shortages of credit in the

US economy'. Indeed, this impact becomes diminished under crunch, and the relationship between interest rates and outstanding credit also weakens. However, the weakness of transmission mechanism stems not only from a "credit crunch" effect, but also from a "recession" effect. In Poland, where recession was not much of a problem, the transmission should be smoother, *ceteris paribus*.

Ganev et al. (2002) claim that analyzing a credit channel of monetary transmission poses considerable problems with finding comparable data and making cross-country inferences. Cetorelli and Goldberg (2008), researching this issue in the U.S. market, point out two observations. First, banks with a global outreach are better positioned to accommodate liquidity shocks, since they are capable of rearranging their resources between their offices worldwide (the concept of "internal capital market"). Second, the mere difference in size of domestic-only and global banks is important, but not critical, which reinforces the advantages to globalization that insulate bank networks from domestic monetary policy shifts. The results obtained by Havrylchyk (2005) are generally reliable, but she finds the magnitude of bank lending channel smaller than in the similar studies performed for the EU, as virtually all regressors are insignificant. It means that 'during monetary contraction (expansion) Polish banks decrease (increase) their lending by far less than (sic! – M.S.) their counterparts in the current EMU member states'. In their insightful paper, published shortly after the breakout of the global crisis, Altunbas, Gambacorta and Marqués (2007) remark on a spectacular increase in securitization activity in the euro area, following the introduction of common currency, which has weakened the bank lending channel. The banks' role shifts from "originate and hold" to "originate, repackage and sell" – thus, banks making use of securitization are more sheltered from the effects of monetary policy, which sometimes appears to possess many characteristics of a blunt tool. However, this very interesting interdependency is irrelevant for Poland. In the most recent paper, Łyziak, Przystupa and Wróbel (2008) found only weak evidence on the credit channel in Poland, by which they only confirm precedent findings. After the monetary policy tightening banks appear to trim down short-term lending, while the longer term loans for investment display lower semi-elasticities with respect to the interest rate. The authors interpret the fact that banks protect investment loans more than the credit in the current account as a cherry-picking process and a flight to quality. A similar phenomenon was observed in Poland after 2008, but it took place as a result of the crunch itself, not in response to the monetary policy. Additional insight into it, embracing corporate credit, is provided by Chmielewski (2006). According to his study, banks' reaction to excessive zeal in monetary policy is weak as regards long term lending to important corporate customers, even

if the loans issued beforehand to them are of poor quality. This reveals a certain significance of relationship management in the domain of corporate (but not SME) lending.

Numerous papers on credit market imperfections are helpful with regard to determining the “victims” of credit crunch. For instance, Tornell and Westermann (2003) reveal that firms from nontradables sector based in middle income countries (including Poland) suffer much more severely from borrowing constraints during the crunch than those manufacturing tradables. Bank-dependency of those companies is a derivative of their small size and little access to world capital markets. Moreover, since banks are strongly exposed to the nontradables sector, a long-lasting credit crunch outlives a usually brief recession, which precedes it. This finding concerning nontradables is confirmed by Varela (2011) who described the sector in question as more vulnerable to shocks, more responsive to interest rates and, simultaneously, more decisive for GDP levels.

Last but not least, an interesting paper on the recent crisis, in context of the emerging economies, was published by Kamil and Rai (2009). Although they examined Latin America and the Caribbean, their empirical results seem to plausibly correspond with the Polish story. In the authors’ opinion, the global crisis has there been cushioned by the peculiar nature of foreign banks’ presence in the region. Local affiliates performed expansionary domestic currency lending, rather than direct cross-border lending in foreign currencies. Moreover, local affiliates’ funding mostly originated from a mounting domestic deposit base, rather than from parent banks or offshore wholesale markets, which would be by definition more volatile during the crisis. These characteristics muted the diffusion of external shocks.

A certain amount of literature on behavioral issues was also researched. However, the downside here is the insurmountable richness of approaches in the realm of behavioral finance and, unfortunately, difficulties arise when it comes to extract valuable insights in these particular aspects of banking that are addressed within the framework of this work. Unquestionably, the narrowness of the subject of corporate lending in an emerging state is the source of a problem.

2.2. Data input sources

This chapter is generally designed to investigate how the real economy indices translated to the bank policies on loans. Hypothetical determinants of declining corporate credit should be divided into several groups, with regard to their verifiability and measurability. Neither widespread panic nor the pattern of relationship between foreign

mother banks' requests to tighten credit policy and the actual activities of Polish-based affiliates is the factor that can be put under strict and serious verification in a scientific paper. They are therefore doomed to be dropped, unless a more courageous author dares to draw some sophisticated dummies. Next, a decline in interbank transactions' volumes due to distrust and poor macroeconomic climate are measurable at least partially. However, it is difficult to put oneself in a position of judge and decide to what extent these phenomena affected the level of credit, as the aggregate mechanisms are biased by excess liquidity, and comparable data for individual banks are hard to retrieve. On top of this, with a considerable dose of certainty, we may infer about the fall in demand for credit, the deterioration of assets and the impact of monetary policy or regulatory body's activity. These factors can also be pretty well measured. The most straightforward portion of the analysis encompasses the investigation of the fall in deposits, credit portfolios (banks' preferences with regard to certain types of loans), and the applying criteria or terms and conditions of credit.

The quantitative analysis is most vitally supported by the data provided by the NBP and the KNF. A significant portion of statistics comes also from Poland's Central Statistical Office (GUS). Quotations of sentiment indices are pulled out from relevant institutions that quote them. Some supplementary data was collected from the European Central Bank's (ECB) Statistical Data Warehouse, the World Bank and the IMF for the sake of side analyses. As missing values are not tolerated within autoregressive models, some had to be interpolated.

Unfortunately, not only the time series are short, but also the frequency of reporting and range of subjects covered by reporting leave a lot to be desired. The situation is changing for better, e.g. from the beginning of 2011 the KNF switched to monthly reporting scheme, which would allow for the extended review of this analysis within several years. However, probably the main flaw that calls for change, apart from the time span of time series (self-solvable as time goes on), is the way in which lending volumes in the economy are reported by the central bank. The analysis would be much more fruitful if it might explain the variability of newly issued loans, rather than just the fluctuations of the outstanding amounts. This would directly capture the behavior of lenders, whereas now it is possible just to indirectly approximate it, since the outstanding amounts are sensitive to the possibly unbalanced maturity of loans in the sample. The study would then achieve its full usefulness. Haplessly, no reporting is made on that with required data granulation and frequency.

The examined dataset included also those enumerated in the table below, as well as their various transformations and derivations. All data concerns Poland.

Table 2. The rudimentary set of variables

	Name	Description (unit, source)	Time span and remarks
1	C_LT_CRITER	Corporate long-term credit: banks' criteria (net percentage, NBP: SLOS)	2003Q04 : 2010Q04
2	C_LT_DEMAND	Corporate long-term credit: firms' demand (net percentage, NBP: SLOS)	2003Q04 : 2010Q04
3	C_LT_POLICY	Corporate long-term credit: banks' policy (net percentage, NBP: SLOS)	2003Q04 : 2010Q04
4	C_ST_CRITER	Corporate short-term credit: banks' criteria (net percentage, NBP: SLOS)	2003Q04 : 2010Q04
5	C_ST_DEMAND	Corporate short-term credit: firms' demand (net percentage, NBP: SLOS)	2003Q04 : 2010Q04
6	C_ST_POLICY	Corporate short-term credit: banks' policy (net percentage, NBP: SLOS)	2003Q04 : 2010Q04
7	COLLATERAL	Terms and conditions of corporate credit: required collateral (net percentage, NBP: SLOS)	2003Q04 : 2010Q04
8	DEBT_INSTR	Debt securities in banks' assets (PLN, NBP)	1996M12 : 2010M12
9	DEPOSITS	Long-term deposits of non-financial sector agents (PLN, NBP)	1996M12 : 2010M12
10	DEPOSITS_CORPO	Long-term deposits of corporates (PLN, NBP)	1996M12 : 2010M12
11	FGN_INDEBT	Foreign non-bank non-government indebtedness of Polish agents (PLN, NBP)	1999Q01 : 2010Q04
12	MARGIN	Terms and conditions of corporate credit: banks' profit margin (net percentage, NBP: SLOS)	2003Q04 : 2010Q04
13	MAX_SUM	Terms and conditions of corporate credit: maximum sum available (net percentage, NBP: SLOS)	2003Q04 : 2010Q04
14	MHL	Mortgage and housing loans (PLN, NBP)	1996M12 : 2010M12
15	NET_FGN_ASSETS	Net foreign assets within financial sector (PLN, NBP)	1996M12 : 2010M12
16	NPL_CORPO	Non-performing corporate loans' share in total corporate loans on the books (percentage, NBP)	1996M12 : 2010M12, methodology changed in 2009
17	NPL_NFS	Non-performing loans' share in total non-financial sector loans on the books (percentage, NBP)	1996M12 : 2010M12, methodology changed in 2009

	Name	Description (unit, source)	Time span and remarks
18	POLONIA_RATE_M	Average monthly unweighted POLONIA reference rate (percentage, own calculations based on NBP data set)	2005-01-24 : 2010-12-31
19	POLONIA_TURNOVER	Average monthly turnover of interbank POLONIA O/N transactions (m PLN, own calculations based on NBP data set)	2005-01-24 : 2010-12-31
20	REPO_RATE	National Bank of Poland's reference rate (percentage, NBP)	1996 : 2010
21	RETAIL_SALES_YY	Year-on-year growth in retail sales (percentage, GUS)	1998M04 : 2010M12
22	SALARY	Average salary in enterprises that employ more than 9 employees (PLN, GUS)	2004M08 : 2010M12, strongly seasonal
23	SI_CONS	Consumer confidence index (pure number, Ipsos Demoskop)	1996M12 : 2010M12
24	SI_CONSTR	Construction sector confidence index (pure number, GUS)	1997M01 : 2010M12, strongly seasonal
25	SI_ECON	Confidence index in the economy or Economic Climate Index (pure number, Ipsos Demoskop)	1996M12 : 2010M12
26	SI_IND	Industry confidence index (pure number, GUS)	1996M12 : 2010M12
27	SI_TRADE	Trade confidence index (pure number, GUS)	2000M03 : 2010M12
28	SME_LT_CRITER	SME long-term credit: banks' criteria (net percentage, NBP: SLOS)	2003Q04 : 2010Q04
29	SME_LT_DEMAND	SME long-term credit: firms' demand (net percentage, NBP: SLOS)	2003Q04 : 2010Q04
30	SME_LT_POLICY	SME long-term credit: banks' policy (net percentage, NBP: SLOS)	2003Q04 : 2010Q04
31	SME_ST_CRITER	SME short-term credit: banks' criteria (net percentage, NBP: SLOS)	2003Q04 : 2010Q04
32	SME_ST_DEMAND	SME short-term credit: firms' demand (net percentage, NBP: SLOS)	2003Q04 : 2010Q04
33	SME_ST_POLICY	SME short-term credit: banks' policy (net percentage, NBP: SLOS)	2003Q04 : 2010Q04
34	TOT_C_LOANS	Outstanding amount of corporate loans (million PLN, NBP)	1996M12 : 2010M12
35	UNEMPL	Registered unemployment (percentage, GUS)	1996M12 : 2010M12, traces of seasonality

Source: NBP, KNF, GUS.

2.3. In search of rational interdependencies

Out of the numerous hindrances that accompanied a long-lasting effort made until both theoretically and empirically plausible interactions between variables were acknowledged, the most important one is the unavoidable risk of reverse causality. It not only makes perfect quantitative orthogonalization unworkable, but also hampers theoretical reasoning. This phenomenon may practically refer to vast majority of links. For instance, the elementary link, perhaps quite old-fashioned nowadays, between (corporate) deposits and (corporate) lending, is vaguer than it seems. The decrease in deposits may inform that companies, unable to apply for additional liquidity, decide to diminish their liquid assets in order to raise investments or settle short term liabilities. In other words, companies are forced to defer their preferred source of liquidity and find alternative one, which are deposits. But the other way round, a drop in deposits – reducing banks' deposit base and thus liquidity – might itself cause a contraction in lending amounts, and then the mechanism of a recurring vicious circle emerges. Such riddles are prevalent.

Portfolio adjustments

In theory, portfolio adjustment theory seems considerably robust. A shift to retail credits is confirmed e.g. by Jakub Borowski from Invest Bank and Maja Goettig from Bank BPH (Kuk, 2009). In both static and dynamic analyses, however, mortgage and housing loans are completely irrelevant descriptor of corporate lending instabilities. This is because both types of loans are inseparably connected with economic growth, thus they both have been growing almost monotonically throughout the recent decade. The shift that took place in 2009, a slight in numbers, although psychologically and graphically compelling, is “lost” in time series' breadth, even in the short term model. The possible extension task is to assess whether the mortgage loans develop quicker just because their ‘backwardness’ is of higher magnitude, and the catch-up needs are greater than for corporate lending. This is suggested by Kokot et al. (2004), who holds the domestic corporate banking in high esteem. To this purpose, equilibrium amounts of mortgage and corporate loans have to be computed for the developed economies.

Not being able to infer from actual lending levels, we may still make an attempt to bear out that banks at least came upon increased incentives to rethink their strategies. To this end a

synthetic measure of risk, named credit risk indicator (CRI), will be helpful. It was proposed by Bank BPH (2010) in one of its reports. It is constructed as follows:

$$CRI = \frac{\frac{\text{value of NPLs among certain type of loans}}{\text{total value of NPLs}}}{\frac{\text{value of certain type of loans issued}}{\text{total value of loans issued}}}$$

It is assumed that CRI below 0.8 indicates that a given segment is relatively low risk, while the range 0.8-1.2 indicates moderate risk, and above average risk loans exhibit CRI greater than 1.2.

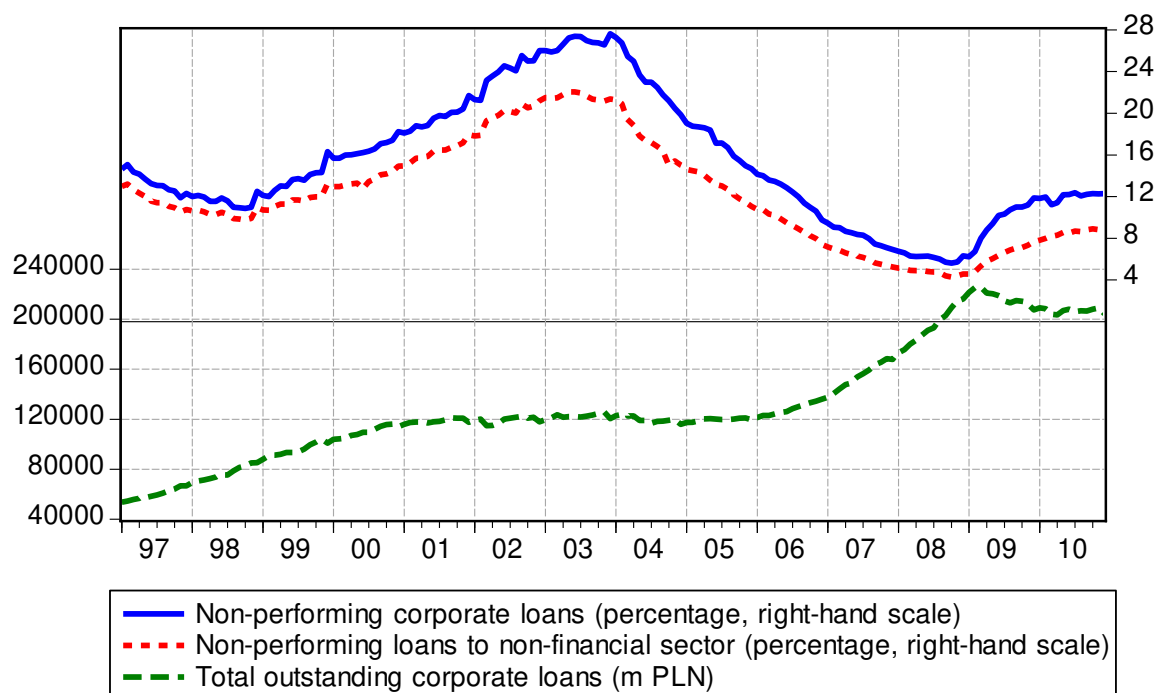
Table 3. Credit risk indicator for particular types of credit

Period	Total corporate		Large enterprises		SMEs		Housing loans			Cash loans	Gov't loans
	PLN	FCY	PLN	FCY	PLN	FCY	PLN	CHF	FCY		
03-2009	1,7	1,0	1,2	1,0	2,0	1,0	0,4	0,1	0,5	1,6	0,1
04-2009	1,7	1,0	1,3	1,0	1,9	1,0	0,4	0,1	0,5	1,6	0,1
05-2009	1,7	1,0	1,3	1,0	2,0	1,1	0,4	0,1	0,4	1,6	0,0
06-2009	1,8	0,9	1,4	0,8	2,1	1,1	0,3	0,1	0,4	1,6	0,1
07-2009	1,7	0,9	1,3	0,9	2,0	1,0	0,3	0,1	0,4	1,7	0,1
08-2009	1,7	0,9	1,4	0,8	1,9	1,1	0,3	0,1	0,3	1,7	0,1
09-2009	1,7	0,8	1,3	0,8	2,0	0,9	0,3	0,1	0,3	1,8	0,0
10-2009	1,7	0,8	1,3	0,8	2,0	0,9	0,3	0,2	0,3	1,8	0,0
11-2009	1,7	0,8	1,3	0,8	2,0	0,8	0,3	0,2	0,2	1,9	0,0
12-2009	1,9	0,8	1,5	0,8	2,2	0,7	0,3	0,1	0,2	1,8	0,0
01-2010	1,8	0,8	1,5	0,8	2,0	0,8	0,3	0,1	0,2	2,0	0,0
02-2010	1,8	0,8	1,4	0,9	2,0	0,8	0,3	0,1	0,1	2,0	0,0
03-2010	1,8	0,8	1,5	0,9	1,9	0,7	0,3	0,1	0,1	2,0	0,0
04-2010	1,7	0,8	1,4	0,9	1,9	0,8	0,3	0,1	0,1	2,0	0,0
05-2010	1,8	0,8	1,4	0,8	2,1	0,7	0,3	0,1	0,1	2,0	0,0
06-2010	1,8	0,8	1,5	0,9	2,1	0,8	0,3	0,1	0,1	2,0	0,0
07-2010	1,8	0,8	1,4	0,9	2,1	0,8	0,3	0,1	0,1	2,0	0,0
08-2010	1,8	0,8	1,3	0,9	2,1	0,8	0,3	0,2	0,1	2,1	0,0
09-2010	1,8	0,8	1,4	0,9	2,0	0,8	0,3	0,2	0,1	2,1	0,0
10-2010	1,8	0,8	1,4	0,8	2,1	0,8	0,3	0,2	0,1	2,1	0,0
11-2010	1,8	0,8	1,4	0,8	2,1	0,9	0,4	0,2	0,1	2,2	0,0
12-2010	1,8	0,8	1,4	0,8	2,1	0,8	0,4	0,2	0,1	2,2	0,0
01-2011	1,8	0,8	1,3	0,8	2,1	0,8	0,4	0,2	0,1	2,3	0,0
02-2011	1,8	0,8	1,3	0,7	2,0	0,8	0,4	0,2	0,1	2,3	0,0
03-2011	1,7	0,8	1,3	0,7	2,0	0,8	0,4	0,2	0,1	2,3	0,0

Source: Own calculations on the basis of NBP's data set.

It is undoubtedly self-explanatory that certain types of corporate loans were among the riskiest ones. It is only during 2010 when cash loans slightly overwhelmed SME PLN credit in terms of default risk. On the contrary, as it has already been indicated, elevated profitability of consumer loans pays off the increased risk, while SME loans are both risky and only moderately profitable. From banks' perspective, foreign currency lending is considerably safer. However, these are by far not as prevalent among corporates, as among individual mortgage-takers (due to scarce significance of the foreign currency corporate lending, the inference in this paper is not controlled for the fluctuations in the exchange rates). Unfortunately, the poor granularity of the raw data set does not allow for running a similar analysis for pre-crisis periods, which would surely be very informative.

Deterioration of assets



Source: National Bank of Poland.

Figure 11. Non-performing loans have been on the rise since 2009, but they did not reach the peak level of 2001-2004. Nevertheless, it seems that this relatively minor surge spurred the decrease in outstanding corporate loans.

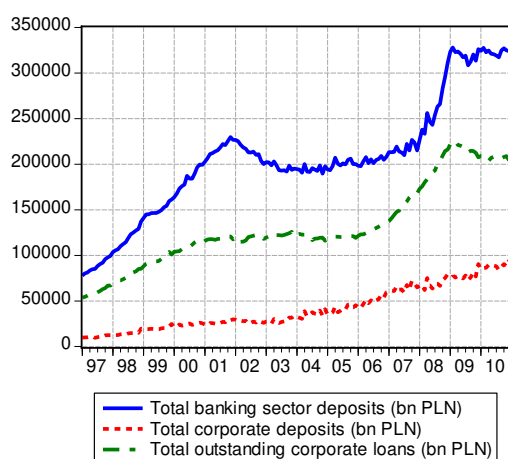
Andrzej Bratkowski claims that there must be a differentiation between a surge in risk and a surge in risk aversion. As the economic conditions worsen, the financial standings of virtually all actors in the economy automatically worsen accordingly. It means that all firms rise up to higher risk categories. Therefore, even if banks' criteria are unchanged, we will

encounter a decline in lending, *ceteris paribus*. Bratkowski theorizes that the deteriorating NPL ratio indicates that banks are still not risk averse enough (*sic!*). Otherwise, with constant risk aversion, they would have avoided the losses, provided that it is possible for banks to obtain perfect insight into enterprises' financial standings. (Bratkowski and Myjak, 2009: 12)

The question remains of how reasonable it is to cut lending automatically when NPLs grow. Possible alternatives include restructuring of prospective loan assessment, which is rather sophisticated option, or niche seeking, i.e. concentrating on serving the least affected industries or the ones, in which comparative advantage may be built. The conception of sacrificing short-term gains in order to maintain decent relationships with clients in the longer horizon, is also meaningful. However, the facts and figures related to NPLs are usually very robust and do not leave much room for alternative interpretations. In fact, the share of NPLs is one of the most important regressors in the equation for lending levels, at least in the short run.

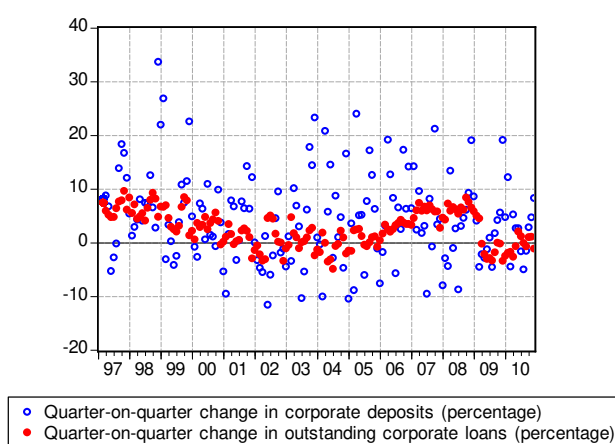
Stagnant deposit base

Liquidity hardships in the interbank market drew corporate banking into increased dependency on both retail and corporate deposits (Bratkowski and Myjak, 2009: 24).



Source: National Bank of Poland.

Figure 12. Deposit base versus corporate lending level.



Source: National Bank of Poland.

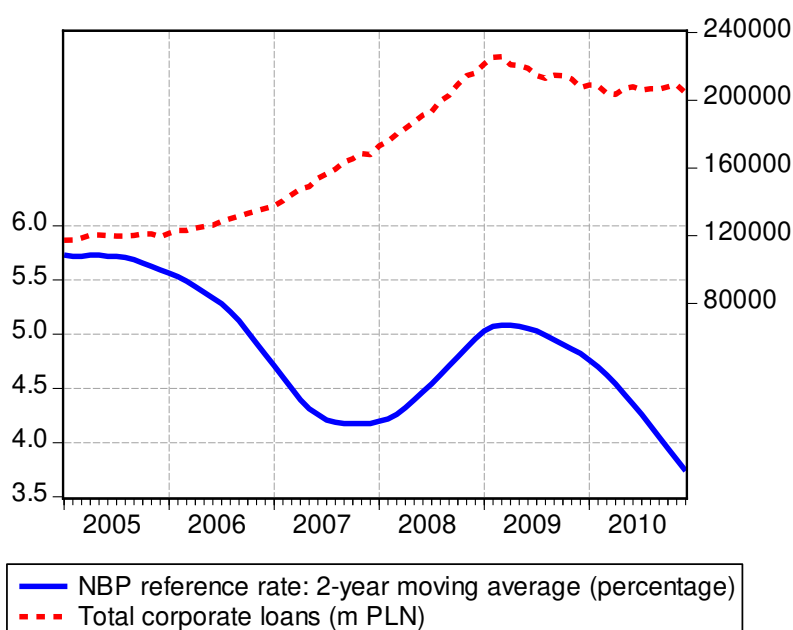
Figure 13. Changes in corporate deposits versus changes in outstanding corporate loans.

What we can observe is that the momentum of lending could be out of breath at the moment, as in 2007 and 2008 their amount has been soaring by far faster than the amount of deposits. However, deposits were just in time to respond to the skyrocketing interest rates and

provided additional liquidity to the banks at the end of 2008. From then on, deposits remained at more or less the same level, but credit crunch started to take its toll.

The figure 13 instructs that corporate deposits are much more volatile than corporate loans. This hampers strategic planning in the long term. This is why corporate deposits may not be the primary source of liquidity for banks, and are merely auxiliary with regard to retail deposits and the interbank market.

Monetary lending channel



Source: National Bank of Poland.

Figure 14. Ambiguous interdependence between outstanding corporate loans and NBP reference rate. In 2008, lending rose amid spiking reference rate, while in 2009 and 2010 it stagnated in spite of the declining rate.

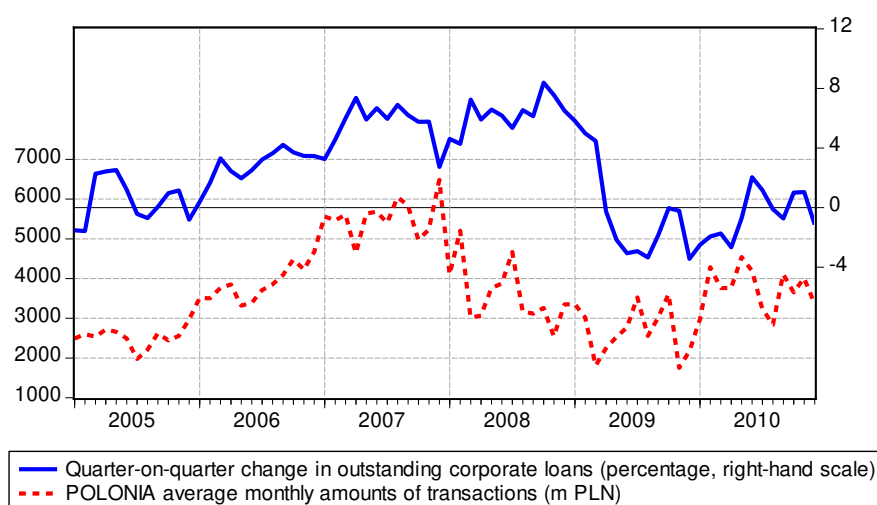
The basic question that needs to be answered is whether the central bank indeed forged contractionary monetary policy during the turmoil. It would be signaled either by reducing the monetary base or increasing reserve requirements, or reducing discount window lending, or, finally, increasing the nominal interest rates.

Repo rate was regularly lowered until March 2006, when it reached 4 percent and remained at this level until April 2007, when no signs of the crisis were visible yet. Repo rate anchored at 6 percent in July 2008. If we assume that banks ‘should’ react, they did so in April 2009, when during just one month, amount of outstanding loans decreased by nearly 5 billion PLN. However, this is about a year after the macroprudential impulse was produced.

There is no compromise on how long the signal transmission in monetary policy takes. However, after rebounding, reference rate dived to 3.5 percent just in July 2009 and demonstrate incredible stability for over one year. Confronted with the facts, it seemingly did not contribute to the rebuilt of corporate credit. The question arises if monetary policy is less futile when contractionary than expansionary, but with just two expansionary and one contractionary period in this sample, it is not judicious to draw definite theses as regards this problem.

To fully assess monetary policy, it is indispensable to take into account other rates quoted by the NBP. However, reserve requirement for banks was at a steady level of 3.5 percent until June 2009, when it was relaxed by 0.5 percent – though not bringing any breakthrough. Other rates, including most important lombard rate, have always been being changed symmetrically to the repo rate.

To make the perspective thorough, attention should be directed to the interbank market. It is interbank market where banks invest excess money or borrow short term funds to stay liquid.



Source: National Bank of Poland.

Figure 15. Outstanding corporate loans as compared with turnover of transactions concluded in the interbank market.

POLONIA turnover has not yet re-reach its record highs from August 2007 (over 6 bn PLN), which overlapped the first days of global crisis. The growing trend seems to be reinforced in the first months of 2010.

The correlation matrix brings very plausible results. On the one hand, POLONIA turnover is moderately useful in explaining short term effects of loans issuance (0.34), but is

not very helpful while considering the total amount (-0.11). On the other hand, increasing reference rate conceivably downsizes the total amount (-0.27), but is highly irrelevant in short term (0.47). Therefore, conditional to the type of dependent variable, either POLONIA turnover or NBP's repo rate exhibit potential to be vital explanatory variables.

However, the monetary policy itself displays only moderate explanatory power, which is in line with e.g. Furceri and Zdzienicka (2011: 22), who claim that the impact of financial crises on growth performance is modestly influenced by monetary policy, whereas fiscal policies are much more effective. Moreover, Grodzicki, Hałaj and Żochowski (2010: 18) empirically prove that domestic interest rates are insignificant in explaining loan growth. Simultaneously high foreign interest rates are associated with higher corporate loan growth. This is typical for financial industries, in which there is the majority of foreign-owned banks.

2.4. High-level inferences

We operate in a communicating vessels framework. The intuitive orthogonalization of dynamic correlations between variables is relatively easy to perform, unlike the assessment of the strength of these interactions, which directly transforms to their significance or non-significance. With regard to the theory-supported data provided in this chapter, the following is implicit:

- A flight to quality occurred: banks have been striving to diminish the share of the most risky assets in their portfolio, giving underperforming enterprises short shrift
- Customers' deposits that stopped growing, were a cause of concern for banks struggling to meet their capital adequacy ratio, unofficially raised from required 8 percent to 10 percent recommended by the KNF (Samcik, 2009) – this implied relatively conservative measures in the area of prospective loans assessment
- Uncertainty among market players led to the demise of the interbank market, where banks used to reinforce their short-term liquidity – nevertheless, excess liquidity was still ubiquitous.

Crunching the available data was even more fruitful in identifying the inferences that are seemingly incorrect, although they used to be more or less frequently put forward by experts. The robustness of these conclusions has been seriously shaken. The reasons are:

- Foreign-based parent banks, in aggregate, did not make an effort to transfer their affiliates' profits abroad, thus the financial standing of domestic institutions, as a whole, has been neither deliberately nor heavily weakened; however, individual exceptions may apply

- Banks have not faced direct liquidity problems, since NBP's open market transactions volume suggests that banks were vested with ample resources and it is a shift in policy or market conditions that diverted their attention from lending activities, not the unmet financing needs
- Central bank's policy was highly unlikely to have any negative effect on lending volumes; although the NBP significantly reduced its reference rate, it did not preclude the decreased corporate lending from arising – it may possibly be another evidence of impaired monetary transmission, not being the strong suit of Poland's financial sector; however, a more detailed analysis is needed to figure out whether NBP's activities nevertheless cushioned the slowdown – what we know for sure now is just that they did not contribute to exacerbating it.

CHAPTER III

BEHAVIORAL DIMENSION

3.1. Desk research

The goal of this paper is to detect whether and to what extent the behavioral factors contribute to the determination of lending amounts. Before moving forward with the model, the crucial “animal spirits”, as Keynes would have said, have to be investigated. Most of them are to some extent unobservables, but the profound impact of animal instincts with regard to the Polish crunch incident is explicitly corroborated e.g. by Brzoza-Brzezina and Makarski (2010: 8). Therefore, although the authors themselves point out measurement complexity, the adopted diagnosis obliges to at least attempt to find relevant proxies. The importance of this brief analysis is clear. The atmosphere of a crisis increases the probability that the decision making process is performed under extraordinary pressure, which makes economic agents more than usual risk averse. The key stressors are:

- Frantic pace of events and the chaotic flow of information, resulting in the data smog
- Uncertainty with regard to the depth, breadth and durability of the crisis, as well as the parties hit; all forecasts are potentially biased
- Uncertainty with regard to the magnitude of austerity measures that actually need to be taken within an organization to secure its financial standing and reputation – as no guarantee exists that a lifeline will be thrown by a third party in case of emergency

Jocelyn Pixley (2004: 146) utters that ‘banks allocate credit according to trust or distrust’, thus inevitably administrative discretion applies. She also rightly says that trust is an emotion best acknowledged when it turns into the opposite, and in moments of crisis little suffices for trust unexpectedly transmuting into blame or rage. This opinion is echoed by Milne (2009), who claims that ‘financial markets are inherently unstable, veering from excessive optimism to excessive pessimism’ and that banks have always leaned towards increasing their lending too much in booms and to reducing it too heavily in recessions.

Obviously, the sinister legacy of panic is accentuated globally. Hence, it is not only a non-fundamental, but also an external candidate for our portfolio of factors. Milne (2009) gives voice to the problem of panic and urges that since the mistakes of the past are irreversible, we should now concentrate on factors that are protracting the duration of the contraction of credit. He enumerates panic responses to the destabilization, the lack of trust in

banks and the fear of how deep the current downturn can yet become. In addition to this, he is far from neglecting psychological and cultural factors behind the situation and emphasizes the cyclical interchangeability between excessive pessimism in bust times and blithe optimism in boom times. Keeping track on this thread, it is useful to refer to Kindleberger (in Pixley, 2004: 169) again, as he describes a set of relations of trust and distrust in a global network of corporate entities as ‘fragile and dynamic’. As Pixley herself continues, ‘there is no avoidance of emotions in the everyday, complicated world of corporate entities engaged in competitive struggles for dominance’.

In the area of more fundamentally financial papers, in their aged, but not an outdated article, Stiglitz and Weiss (1981) show that even in a competitive equilibrium a loan market may be characterized by credit rationing. It may be stirred by the existence of several types of informational asymmetries: adverse selection, moral hazard, monitoring.

When it comes to Poland-specific research, Wilkowicz (2009) quotes Bratkowski who confirms that risk aversion is to blame for corporate credit contraction in the first half of 2009. Banks’ deteriorating liquidity and capital constraints were allegedly of only minor sway. The economist has also remarked that senior loan officers highlighted in quarterly SLOS questionnaires (discussed in detail below) that poor macroeconomic situation is the key inhibitor to credit expansion. However, a possible bias is associated with this statement. For marketing purposes, banks are uneasy to communicate capital or liquidity problems. Instead, they explain to the public that it is the crisis, whatever it means, that restrains credit supply. Moreover, it is also a shrewd justification for increases in margins or required collaterals.

Some scholars also infer that reduced crediting in the banking sector might result from low competition, determining weak motivation to fight for clientele. On the one hand, this appears to be a compelling explanation, on the other hand the method of validating this hypothesis would have to be too discretionary. The level of competition in the banking sector is not merely the derivative of the level of concentration, as the banking industry is “suspected” to be a contestable market, in Baumol’s sense (see Baumol, W. J., Panzar, J. C. and Willig, R. D., 1982, *Contestable Markets and the Theory of Industry Structure*), as found out by Pałowska (2010). Moreover, Panzar and Rosse test applied by her deduces that the Polish financial industry is characterized by rather decent competition level.

Eventually, behavioral aspect of the credit crunch will thus be measured here through:

- Macroeconomic indices, including retail sales, unemployment and salary
- Sentiment or confidence indices
- NBP’s Senior Loan Officer Surveys (SLOS) and surveys performed regularly among firms

3.1.1. Macroeconomic climate

Most of the scholars and bankers accentuate the importance of mutual trust between the market players. Although the financial world is more often than not considered to be a ruthless kingdom of rationality, this pop-culture-rooted image emerges as ultimately invalid in the light of latest developments. Murphy (2009, 284-285), for instance, offers a spiral theory of how the crunch has actually been built up, in which the issue of confidence is of prominent importance. Not surprisingly, the first step is a lack of confidence between financial institutions themselves, which reduces their “largesse” and willingness to lend to each other. This, subsequently, disseminates to other investors, too. Furthermore, the demand for good quality collateral significantly skyrockets. However, a hiking cost of funding decreases banks’ profitability and constitutes another premise for reduced ability to lend. However, the widespread demise of securitization facilitates the return of assets back on the firms’ balance sheets, which reinforces their appetite for additional liquidity. Nevertheless, here is where confidence comes into play again. As the stress in the funding market persists, banks strive to communicate decent results to the market, proving sound financial status. In order to do that, they reduce their funding liquidity risks, i.e. protect themselves from the customers’ panic. At the top of everything, central bank’s intervention may turn out to be inadequate to reliquify the financial system if the confidence loss is too severe.

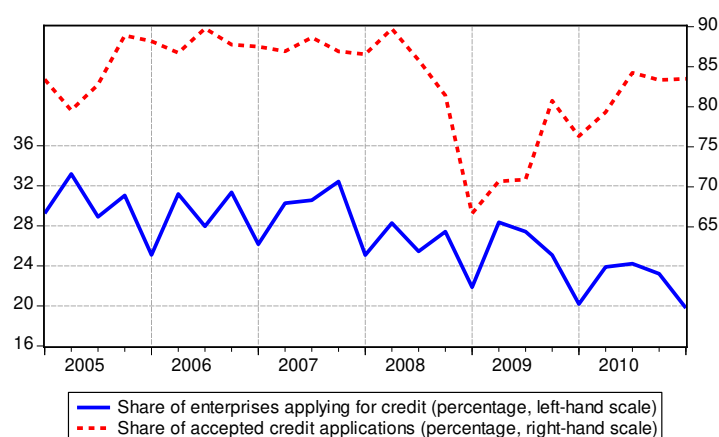
Intensifiers of the global crisis were complexity and leverage, as noted by Gorton (2008) and Murphy (2009). None of these is particularly helpful when researching the Polish case. What then multiplied a relatively weak external signal and elicited the crunch in Poland? Qualitative evidence illustrates that sometimes only little suffices. Investors in Poland are notoriously quite over-sensitive to external information. A good example is the Warsaw Stock Exchange, where investors are frequently reported to overreact in response to the news releases concerning the U.S. unemployment-related figures or those on Chinese export. This quite megalomaniac feedback, stemming from apparent overestimation of the law of communicating vessels’ magnitude is inherent, but not fully justified in a still pretty remote marketplace.

Another intensifier had to do with fundamentals, though not being fundamental itself. It is uncertainty of banks with regard to how balance sheets perform in peer banks, the issue already raised earlier in this paper. The equivalent doubt might, however, hold for the enterprises as well, hence quite spectacular write-downs were made after businesses went astray after dissipating lavish amounts of money when investing in options. Not being sure

about the scrutiny with which one's business partner runs his firm, one may have reasonable worries surrounding the decision whether to grant a trade credit or not. Thus, uncertainty prevailed within three channels: banks to banks, banks to enterprises, and enterprises to enterprises, with this last relationship being out of scope of the pertinent study.

Let's now explore the demand side of the problem to search for further intensifiers. Granted, the exporting firms, or each one plugged to a smaller or greater extent to the international trade, encountered uncertainty. Pre-emptive procrastination as regards big investment projects, plus slightly excessive thrift concerning firms' day-to-day operations, would be understandable, as in line with the "better safe than sorry" approach. Nevertheless, what about the colossal portion of enterprises that have no linkages to abroad and operate on a "safe and sound" market located in the "green island" surrounded by the ocean of crisis. May such an appraisal, frequently re-echoed by not only the local media, discourage anyone from borrowing additional funds in order to continue on thriving expansion? Such an inference may not be ruled out. According to the conventional risk aversion concept, a potential loss looms larger, i.e. it is perceived more harmful, than an equally likely gain of the same magnitude is perceived to give pleasure (Brooks and Zank, 2004: 2-3). All in all, it is seemingly better, or at least more compliant with textbook economics, to overestimate the risk than to underestimate it. However, it seems that the fall of demand was only secondary to the less favorable lending conditions, which were rather the primary indicator of the crunch.

The figure 16 authorizes the inference that the decline in demand in 2009 was less pronounced than the increase in banks' aversion to lend.

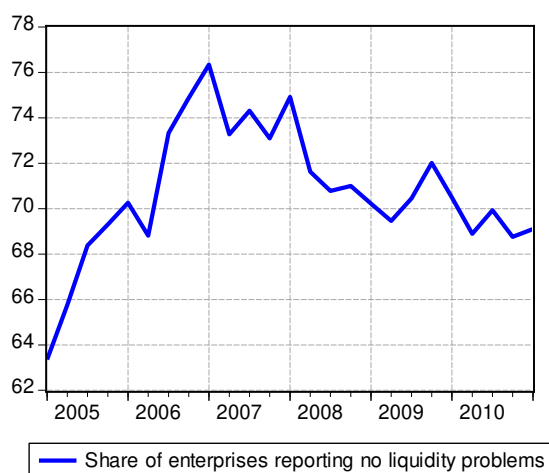


Source: National Bank of Poland (2011a).

Figure 16. Fewer enterprises were interested in obtaining a loan in 2009 and 2010, but the slightly decreasing trend is rather long-term. When it comes to acceptance of credit applications, bigger decline is visible. Yet in 3Q 2008 banks accepted nearly 90 percent of applications, and they came down to less than 70 percent in 1Q 2009.

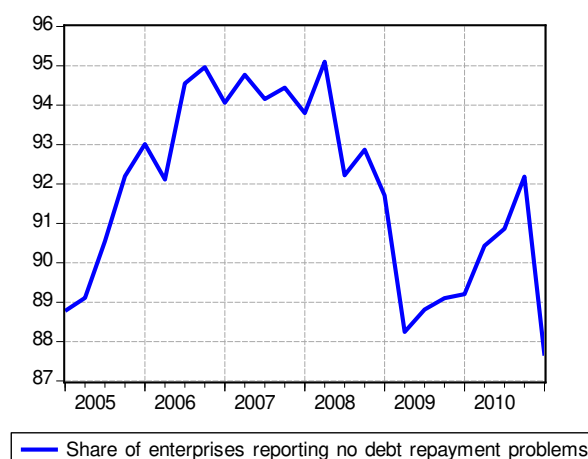
Overall, despite the slowdown, Polish firms stayed in relatively good shape. For sure, given the limited scope of corporate lending in the Polish economy, the problem of excess borrowing was scarce. The only problem arose in 2009 and was related to excess investment in derivatives. (Bratkowski and Myjak, 2009: 23). But neither firms' internal problems, nor banks' repelling policies seem likely to decrease enterprises' appetite for loans, particularly for the short-term ones.

The figure 17 below shows that firms' liquidity standing has been deteriorating throughout 2007 and 2008. Back then, it did not ignite banks' risk aversion. Analogously, the figure 18 demonstrates that the share of enterprises having trouble with debt repayment quaked in 2008, but in fact, it seriously nosedived a year later. Still, with more than 87 percent of firms repaying bank credits in time, the overall condition of Polish enterprises is pretty optimistic.



Source: National Bank of Poland (2011a).

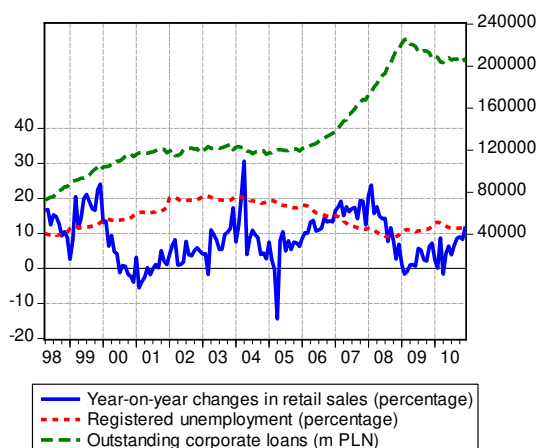
Figure 17. Liquidity standing of Polish enterprises started to deteriorate yet in 2007, while in 2009 and 2010 it was rather stable.



Source: National Bank of Poland (2011a).

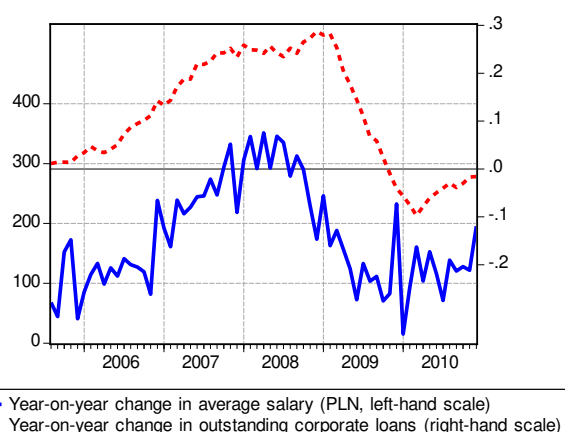
Figure 18. Share of enterprises reporting no problems with bank debt repayments declined sharply in 2009 but embarked on a rebound in 2H 2010.

Banks always take a look on macroeconomic data, being an indicator of macroeconomic environment condition. The most important ones are data on unemployment, salary and year-on-year retail sales. The variable representing salary concerns the average wage in enterprises employing more than 9 people (micro firms are excluded).



Source: GUS, National Bank of Poland.

Figure 19. The interplay between total corporate loans and year-on-year changes in both retail sales and unemployment. Retail sales figures are not compelling, but they are valid in juxtaposition with marginal credit fluctuations.



Source: GUS, National Bank of Poland.

Figure 20. Year-on-year changes in average salary and outstanding corporate loans reveal convincing cointegration-like relationship, but the time series is relatively short.

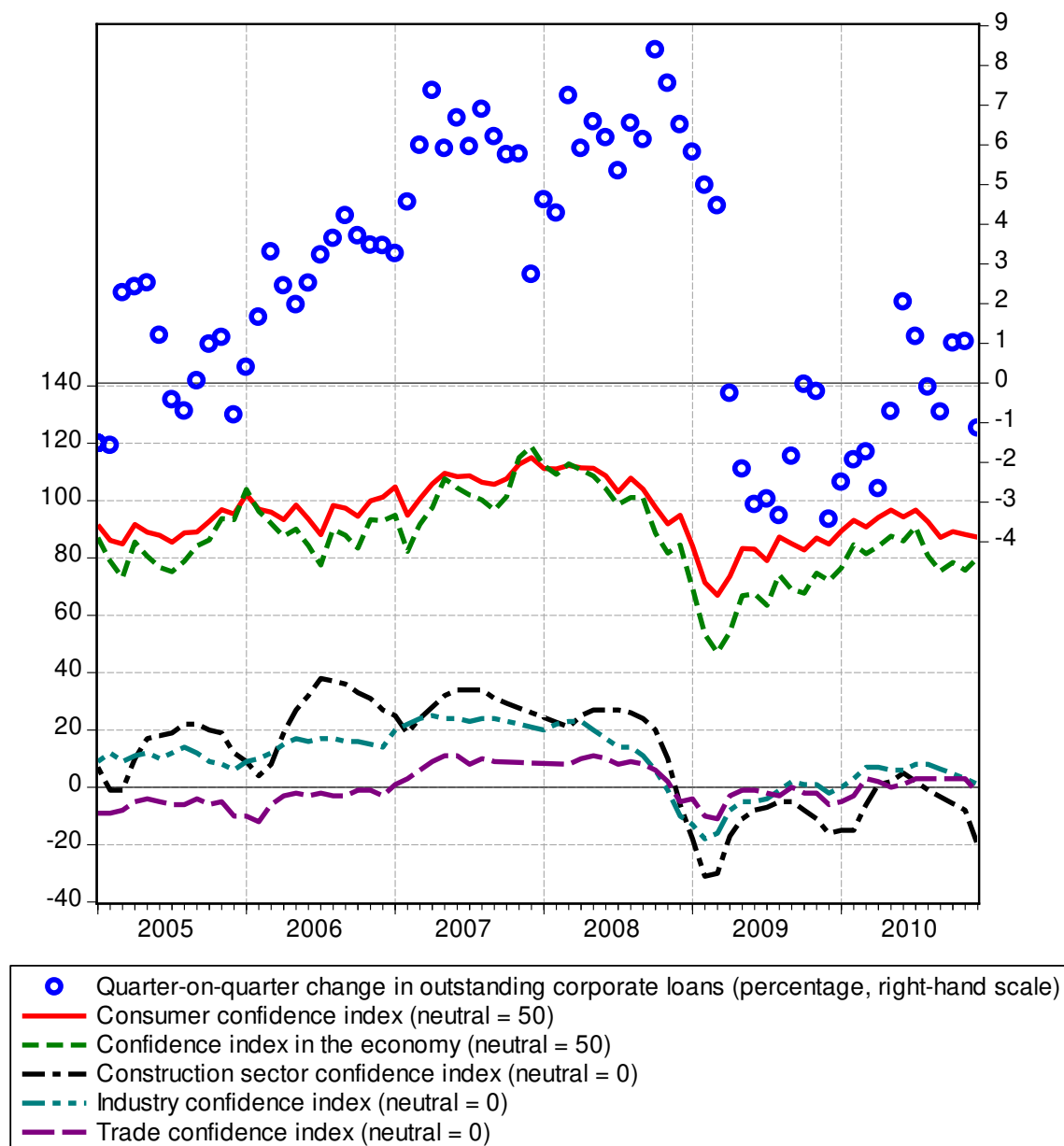
Both the salary and the percentage of unemployed are to a large extent seasonal, with high peaks (in case of unemployment) or drops (in case of salary) at the beginning of each year. This is why it is better to use total values rather than monthly fluctuations as a base to correlation check. The instantaneous correlation coefficient between outstanding corporate loans and unemployment rate is -0.229, but it improves to -0.265 with unemployment's sixth lag and to -0.289 with the twelfth lag. Although the sign of the interdependence is doubtless, the strength could have been better.

What was expected was no impact of regressors on monthly fluctuations of corporate lending. Correlation coefficients are all below 0.33. Instead, there is very strong and plausible interaction between salary and unemployment, and corporate lending levels. Year-on-year changes in retail sales, on the contrary, displayed negative correlation, which may be perceived as mind-boggling and extremely contrary to the anticipations, but the lagged values are more informative in this case.

3.1.2. Sentiment indices

Sentiment indices are imperfect reflection of reality. They are based on surveys to a limited, though considered representative portion of the population. They seem to be fairly

well intertwined with the output value of corporate credit. It may be seen clearly on the figure 21, that sentiment indices have given an advance indication of decreased prosperity by falling sharply at the end of 2008. However, sentiment index in trade and in industry have been falling not comparably deep as the other indicators.



Source: GUS, Ipsos Demoskop, National Bank of Poland.

Figure 21. Sentiment indices are quite collinear and nuances will decide which variables out of these will be utilized in final model estimation.

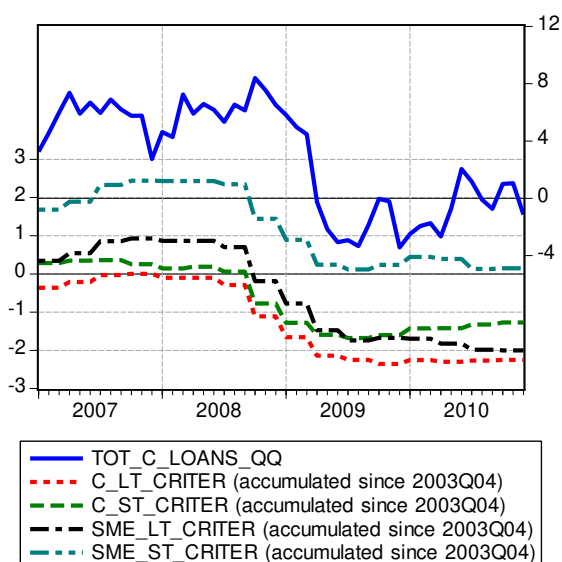
Instantaneous correlation matrix proves the visual interpretation. The positive interplay between sentiment indices levels and quarter-on-quarter change in outstanding corporate

loans is robust. However, there is no positive correlation with total, non-differenced levels, apart from sentiment index in trade, but even then, the correlation coefficient is low (0.253). With three lags applied to the values of indices, the coefficient of trade confidence index rises (0.439), but the other ones remain negative. It seems that fluctuations in prosperity contribute to the marginal change of dependent variable, but in the long run they are a useless regressor. Nevertheless, the time series is perhaps too short to come out with such implications.

3.1.3. SLOS questionnaires

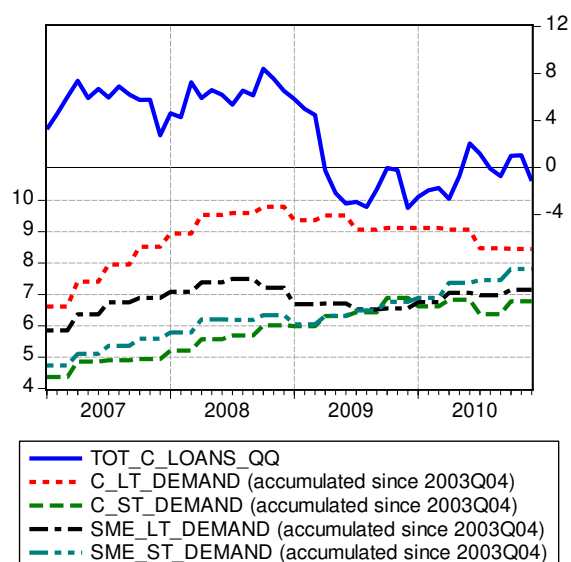
Polish methodology of Senior Loan Officer Survey (SLOS) interprets each positive number, defined as the net percentage, as a favorable change from customer's perspective. For instance, if the banks' interest margin yields positive figure, it means that banks have in fact relaxed their policies on margin. A net percentage is thus a difference between optimists and pessimists numbers related to the total number of respondents answering particular question in the survey. This is obviously only a synthetic proxy, with no direct interpretation.

This short visual analysis indicates that most probably lending criteria would equally well be a dependent variable instead of the credit volume. However, one may have concerns about the amplitudes – banks were desperately tightening their policies to the verge of reason.



Source: National Bank of Poland (2011b).

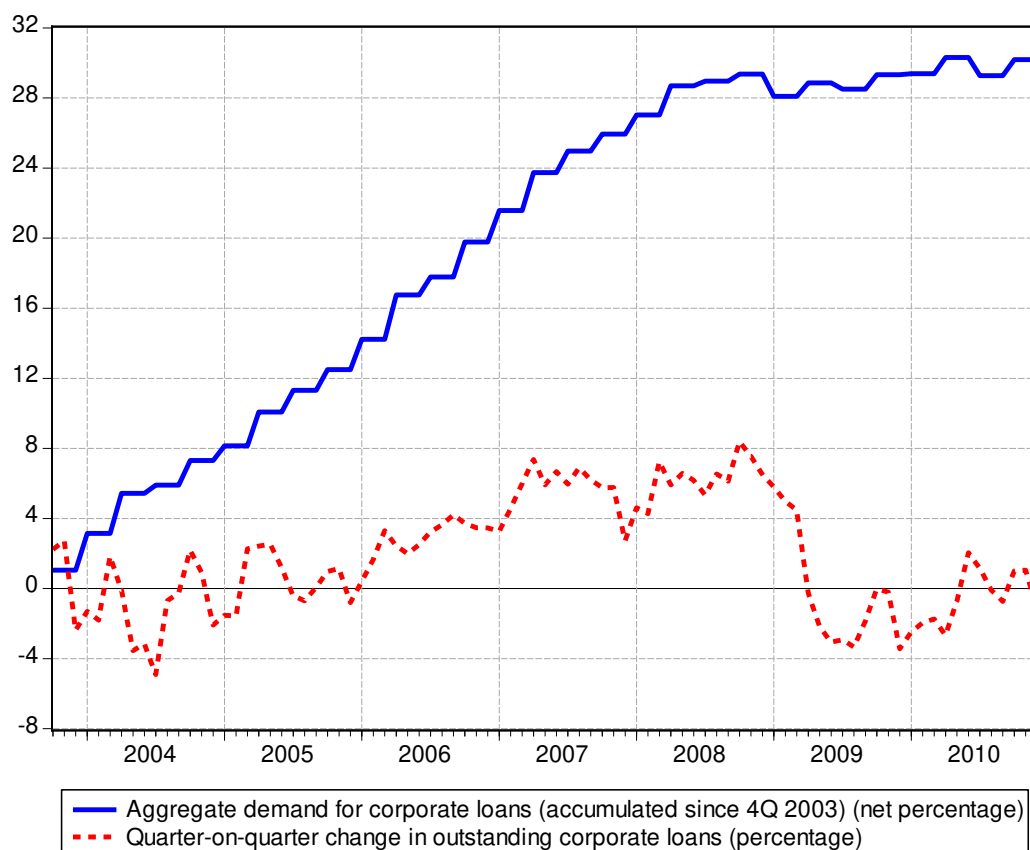
Figure 22. Corporate loans criteria broken down by type of credit.



Source: National Bank of Poland (2011b).

Figure 23. Demand for corporate loans broken down by type of credit.

Intuitively, one might say that by tightening lending criteria and restraining terms and conditions of credit, banks release an unequivocal signal that all they want is to lend less. Theoretically, this interdependency does not have to hold, since the creditworthiness of borrowers may improve in line with the increasingly strict credit parameters. Actually, what is really informative in this field of discussion, is the aggregate plot covering broader period.



Source: National Bank of Poland (2011b).

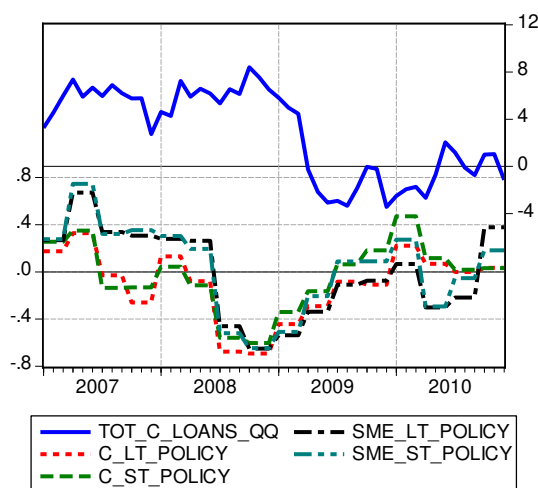
Figure 24. Quarter-on-quarter change in outstanding corporate loans compared with synthetic measure of accumulated (starting 4Q 2003) aggregate firms' demand for credit. The demand stopped growing in 2008, which translated to the decreased lending a year later.

It is evident that as soon as the demand stopped growing, the amount of outstanding credit fell. Although such a dramatic causality perhaps did not happen, the above graphic is still much of a help.

The recent paper of Grodzicki, Hałaj and Żochowski (2010) adopts a panel model to test if Polish individual banks' lending policies have an impact on banks' loan supply. Instinctively, a positive relationship is evident here, since by declaring stricter policy a bank signals its greater than before reluctance to lend. Nevertheless, the paper is still valuable for

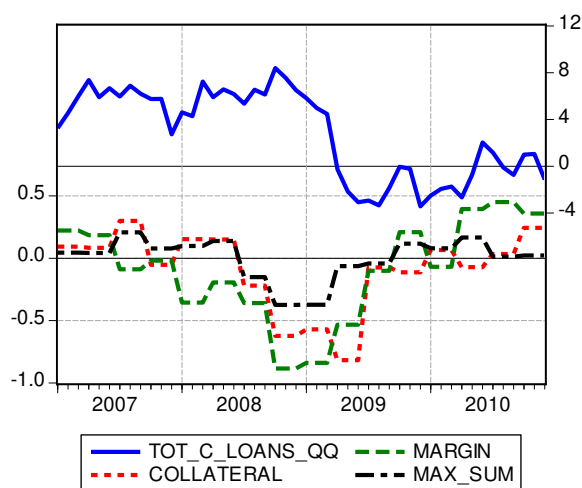
the sake of this research, as it features commercial loans and offers considerably in-depth theoretical background. Employing data from the Polish bank lending survey (SLOS), the authors controlled also for demand-side factors. Predictably, they concluded that individual bank lending strategies are an important driver of credit growth. Interestingly, fundamental constraints (e.g. capital or liquidity) were much less significant in determining this dynamism.

While proceeding further into the analysis, the authors discovered that banks which operate in the corporate loan market adjust loan supply much more forcefully by changing the loan approval criteria than by changing the terms on loans such as price, maturity or loan collateral. According to the researchers, it is because of two mechanisms. First, large corporates are seasoned borrowers having a good grasp of the market and due to fierce competition it is easy to discourage them. On the opposite, credit standards are rather opaque to the firms and it is less risky to manipulate them. Second, banks' treatment of corporate customers may be excessively rigorous due to 'past episodes of corporate financial distress in mid-1990s and early 2000s'. Again, credit rationing channeled by credit standards is more convenient, as it empowers banks to review the applications that theoretically meet loan terms and conditions, but eventually reject the ones that do not fulfill augmented minimum acceptance criteria. (Grodzicki, Hałaj and Żochowski, 2010: 17-18)



Source: National Bank of Poland (2011b).

Figure 25. Banks' policy towards certain types of corporate lending.



Source: National Bank of Poland (2011b).

Figure 26. Terms and conditions of corporate credit, applied by banks.

The figure 25 above puts on view the just discussed shifts in banks' policies towards crediting. Surprisingly, until mid-2008 they were more likely to favor inherently riskier SMEs rather than corporations. Afterwards, all the approaches have more or less leveled off, with

short-term credit for corporations slightly more privileged throughout 2009 and first half of 2010.

The figure 26 is also interesting. It stems from the theory that the stricter rules in terms of required collateral were particularly calamitous to the lending levels. The thing is, as the value of firms' assets has supposedly been shrinking, lenders should adjust the requirements by setting them at the lower level. In fact, banks' measures were opposite and might have magnified the crunch. Obviously, it was banks' response to the information asymmetry, an imbalance that marks its presence particularly during the periods of distress. The problem of informational opacity between firms and banks is often raised in literature (e.g. Berger, Molyneux and Wilson, 2010; Steijvers and Voordeckers, 2009; Stiglitz and Weiss, 1981), since it typically gives rise to above-average credit rationing. However, while constituting an at least partial solution to information asymmetry issue, the enforcement of higher collateralization may not necessarily combat the adverse selection problem. Both the value and even the quality of assets held, alone, do not provide sufficient information on a given firm's operating activity and its prospects. Stiglitz and Weiss (1981: 402-405) indicate, under reasonable assumptions, that the higher collateral requirements imply that firms can only finance smaller projects with higher risk. Therefore higher collateral fuels adverse selection. The presumption of adverse selection in Poland is expressed by Bratkowski in Bratkowski and Myjak (2009: 12): while well-performing companies tend to wait until they apply for a new credit, the weaker ones struggle to gain liquidity, since it may be the only tactics aimed at avoiding bankruptcy.

Moreover, with regard to other constituents of terms and conditions of corporate credit, Hempell and Sørensen (2010: 15-16) found that increases in margins on both average and riskier loans tend to bring about a decline in loan growth in following quarters. Comparably, introducing restrictions on the size of loans offered has also a significant and even stronger negative impact on loan growth. Although their study covers only the euro zone states, it seems that the applicable results are too intuitive to be rejected in Poland's case.

Obviously, terms of credit do not influence directly the amount of outstanding loans. They may only affect decisions. Based on the aforementioned arguments, it seems that the regulations concerning collateral are of most crucial magnitude among the three proposed.

3.2. Behavioral impact summary

Gorton (2008: 62) in his own, quite U.S.-centric, analysis of the crisis-related panic, underlines that its roots lie in the fear of losses, the extent of which cannot be determined, due to opacity of modern financial instruments. Accordingly, he points out also a ‘virulent knock-on effect’: evaporated liquidity. ‘With no liquidity and no market prices, the accounting practice of marking-to-market became highly problematic and resulted in massive write-downs based on fire sale prices and estimates’. Massive collateral calls exacerbated liquidity problems even more. On top of that, a refusal to lend embodied an “official” credit crunch.

Although not all pieces of this puzzle match the domestic credit crunch logic, the underlying analysis justifies the conclusion that non-fundamental premises had a profound influence on lending volumes. Manipulating credit terms and conditions and excessive flight to liquidity, amplified by sometimes maniacal fixation on what global players do, are altogether the best description of the Polish economic landscape during the turbulence. Unfortunately, there are shortcomings and controversies that seriously undermine leveraging the behavioral data in the model. First, the quantity of those time series is limited: there are fewer non-fundamental time series than fundamental ones. Second, most important, vast majority of them is characterized by collinearity problem. Including more than one sentiment index, or more than one SLOS-based variable, increases the risk of unauthentic regression. Third, the non-fundamentality of some variables remains highly debatable. It is relatively simple task to defend the claim that banks’ policies, criteria or terms and conditions of credit are, logically, identical to the aggregate lending level. If we assume that banks pre-define their target credit issuance, the above mentioned serve just as tools to achieve the goal. Whenever effective, these tools should perform in a way that ensures the desired outcome. If so, the model would yield an identity correlation and would not be based on accurate economic reasoning. The crucial question which is implied by that is whether we should treat banks’ lending policies as primary input. Certainly not, as they more often than not derive from exogenous impulses and are not independent. Fourth, the fact that the crucial source of information concerning enterprises’ demand for credit comes from within the banking industry, is a source of a potential bias. Banks might either deliberately underreport the demand, willing to be cleared of responsibility for sluggish lending, or simply unwittingly misjudge it. No doubt that the query on customers’ demand belongs to the most problematic questions in the SLOS questionnaire, and it would be useful to develop an alternative indicator for this variable, rooted in the real economy, not the banking sector.

CHAPTER IV

ECONOMETRIC EVALUATION

4.1. Choice of estimation method

Capturing the evolution and the interdependencies between multiple macroeconomic time series entails vector autoregression models to be employed, as they appear to be most relevant for this purpose. Since nearly all variables from the ultimate data set, except for the trade confidence index (SI_TRADE), exhibit unit root, vector error correction model (VECM) seemed to be the best option. The system allows for maximum eight lags. Although both Wald lag exclusion test and lag length criteria validate the specification with eight lags, overloading such a concise model with so many parameters does not seem to be reasonable from theoretical point of view. Finally, the representation with six lags is tested. Lags two and five do not pass the test, but they are not excluded, since no theoretical explanation seems feasible in this case. Probably it is the shortness of time series which spoils the test results.

Table 4. Lag exclusion test for the specification with six lags. Numbers are p-values

Sample: 2005M01 2010M12					Included observations: 66			
	TOT_C_ LOANS_ QQ	RETAIL_ SALES_YY	SI_ TRADE	NPL_ CORPO_ QQ_PP	SME_LT_ DEMAND	POLONIA_ RATE_M	POLONIA_ TURNOVER	JOINT
Lag 1	0.000123	0.786240	0.000622	2.26e-06	0.094980	0.018955	0.348944	0.000000
Lag 2	0.254061	0.872605	0.882387	0.889927	0.672205	0.945880	0.555583	0.590760
Lag 3	0.039737	0.419636	0.033821	0.291775	0.763842	0.539723	0.299724	1.20e-05
Lag 4	0.942206	0.973629	0.360840	0.486999	0.286614	0.097939	0.084008	0.001312
Lag 5	0.363105	0.675672	0.294864	0.742457	0.797899	0.557277	0.689711	0.287322
Lag 6	0.104446	0.992601	0.004425	0.644128	0.896700	0.927370	0.326620	0.000162
df	7	7	7	7	7	7	7	7

Source: EViews 5 output.

After defining appropriate lag length, however, Johansen cointegration test has been carried out and revealed that no cointegrating equations may be defined.

Table 5. Johansen cointegration test output: summarized all five sets of assumptions

Sample: 2005M01 2010M12			Included observations: 70		
Series: TOT_C_LOANS_QQ RETAIL_SALES_YY SI_TRADE NPL_CORPO_QQ_PP SME_LT_DEMAND POLONIA_RATE_M POLONIA_TURNOVER					
Lag interval: 1 to 1					
Specification:	1	2	3	4	5
Data trend:	None	None	Linear	Linear	Quadratic
Intercept:	No	Yes	Yes	Yes	Yes
Trend:	No	No	No	Yes	Yes
Trace	3	4	7	3	4
Max-Eig	1	0	0	0	0

Source: EViews 5 output.

Although trace statistic yields equivocal results, maximal eigenvalue method is commonly referred to as more reliable and it should be taken into consideration as primary indicator for the number of cointegrating relations. Such an approach is recommended e.g. by Kennedy (2003), and Johansen and Juselius (1990), who point out that maximal eigenvalue test is more powerful than trace test by providing more definite results. As far as it can be inferred from the visual inspection of the data, the second specification (intercept, but no trend) is the most relevant in this case. A detailed Johansen test, presented below, strengthens the obtained results. Max-eigenvalue test indicates no cointegration at the 0.05 level.

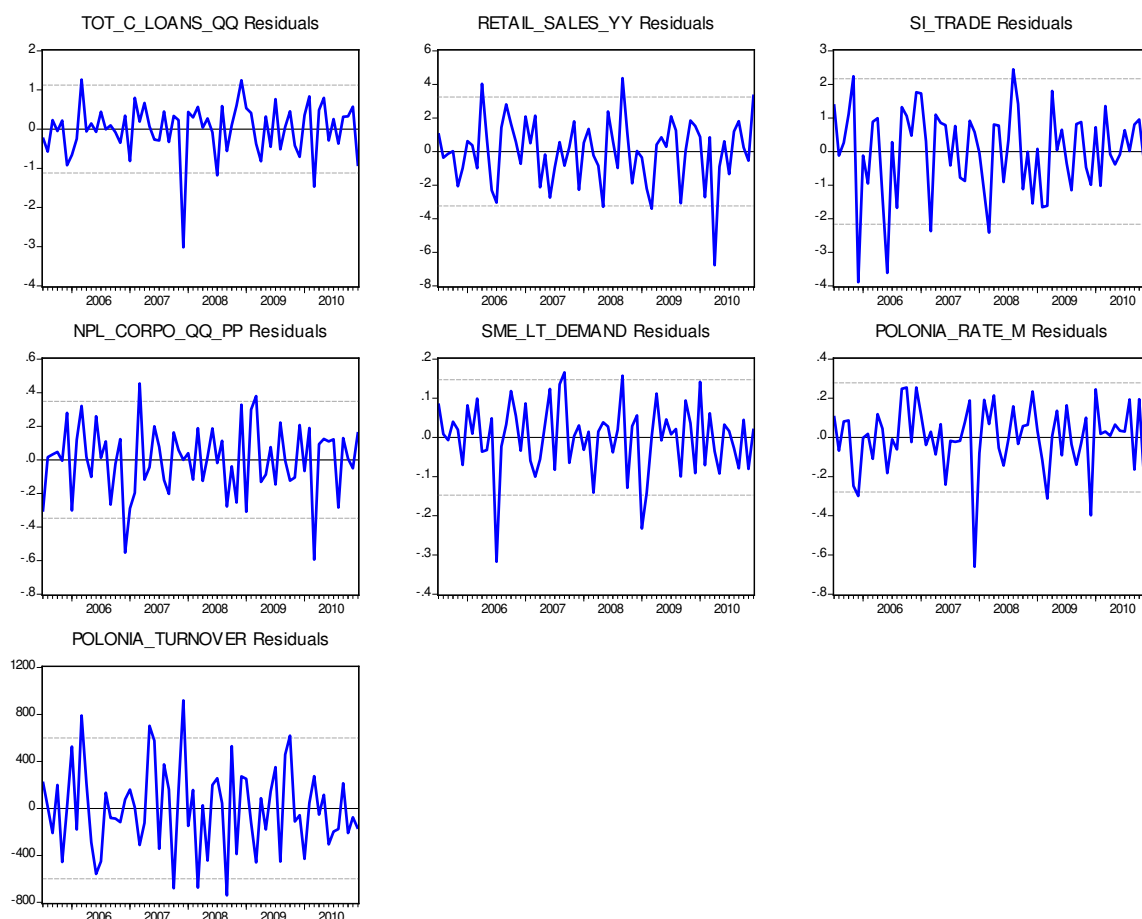
Table 6. Johansen cointegration test output given assumptions of no deterministic trend in data and intercept in cointegrating equations

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized number of CEs	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None	0.461186	43.28698	47.07897	0.1204
At most 1	0.391130	34.73058	40.95680	0.2120
At most 2	0.323882	27.39712	34.80587	0.2913
At most 3	0.306811	25.65170	28.58808	0.1134
At most 4	0.199801	15.60260	22.29962	0.3274

Source: EViews 5 output.

Given no cointegration, the return to VAR-based modeling on non-stationary levels is justified according to e.g. Canova (2007), as long as the residuals remain stationary. As a matter of fact, there are also some researchers who prefer the differenced time series to be

estimated instead (see Kakes, 2000; Wang, Kutan and Yang, 2005), but this approach will not be followed now. The stationarity of residuals will be formally verified with the help of ADF test, but the figures below already indicate that error terms are rather not spoiled by any serial correlation and can be assumed to be white noise.



Source: EViews 5 output.

Figure 27. SVAR residual plots.

Table 7. Augmented Dickey-Fuller test for stationarity of the residuals

Null Hypothesis: a given residual has a unit root		Max lag = 6
Time series	Augmented Dickey-Fuller test statistic	Prob.
TOT_C_LOANS_QQ	-9.360625	0.0000
RETAIL_SALES_YY	-7.671519	0.0000
SI_TRADE	-7.957878	0.0000
NPL_CORPO_QQ_PP	-10.37334	0.0000
SME_LT_DEMAND	-9.131117	0.0000
POLONIA_RATE_M	-8.783385	0.0000
POLONIA_TURNOVER	-8.995802	0.0000

Source: EViews 5 output.

In order to diagnose the credit crunch, a structural vector autoregression (SVAR) model, based on monthly data, was selected. It allows for appropriate orthogonalization of external shocks and deriving correct inferences concerning causal relationships in the system. Not only the joint dynamics of a set of variables is represented, but also the economic relationships are reflected more accurately than by the reduced form of VAR. In this chapter, a model building process will be briefly replicated, so that to ensure it possesses an appropriate theoretical structure and yield relatively reliable estimates of potential output. Structural VAR model's cornerstone principles were set in the 1980s after the renowned Sims critique. The major one is no a priori supposition of endogeneity or exogeneity. Overall, two features of the structural form make it the preferred candidate to represent the underlying relations in our model:

- Error terms are not correlated. The structural, economic shocks which drive the dynamics of the economic variables are independent, which infers zero correlation between error terms as a desired property.
- Variables can have a contemporaneous impact on other variables. This is a desirable feature particularly when using low frequency data.

Using SVAR models we determine the shock and then discuss impulse responses of the dependent variable. Since the impulse responses can substantially differ in various identification schemes, a theoretical justification is provided to derive arguments in support of the robustness of results.

4.2. Credit crunch model

4.2.1. Specification

Numerous experiments with different data sets, lag lengths, orderings of variables, as well as with different forms of VAR have been carried out. The available time series were very short in some areas, e.g. variables capturing the interbank market are quoted only since January 2005, while the Senior Loan Officer Survey was first released in the last quarter of 2003. This is a serious malady when forming a long-term model. Therefore, the effort in this paper is directed toward the short-term, crunch-dedicated measurement. The quasi-dependent variable, from point of view of this paper's main goal, is the quarter-on-quarter percent change in outstanding amount of corporate lending. Both large firms, and small and medium-

sized enterprises are included, as contrary to self-employed sole traders and individual farmers that are not treated as firms in this framework. The set of variables, which remained robust after numerous iterations is presented in the table below, which precedes the extended description. Available time intervals for selected variables were displayed for information purposes only. In the model, 2005M01-2010M12 time span is employed, as the joint time interval of VAR is always as long as the overlap between the time series of all variables in the system.

Table 8. The data set of regressors

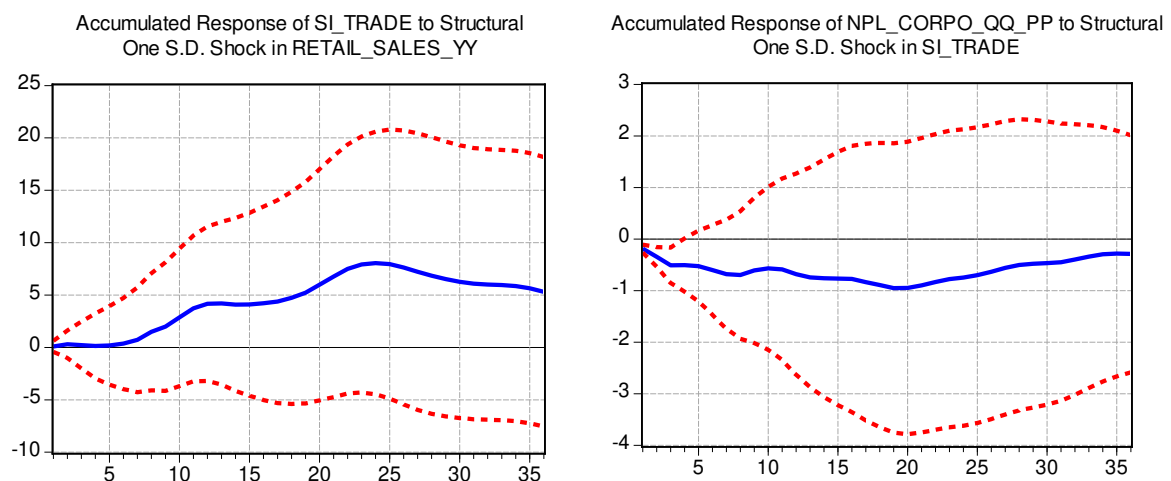
	Variable	Unit	Time interval	Source
1.	Quarter-on-quarter change in outstanding amount of corporate loans (TOT_C_LOANS_QQ)	percentage	1997M03 – 2010M12	NBP
2.	Year-on-year growth in retail sales (RETAIL_SALES_YY)	percentage	1998M04 – 2010M12	GUS
3.	Trade confidence index (SI_TRADE)	pure number	2000M03 – 2010M12	GUS
4.	Quarter-on-quarter change in non-performing corporate loans' share in total outstanding corporate loans (NPL_CORPO_QQ_PP)	percentage points	1996M12 – 2010M12	NBP
5.	Demand of small and medium sized enterprises for long-term credit (SME_LT_DEMAND)	(net) percentage	2003M10 – 2010M12	NBP: SLOS
6.	Average monthly unweighted POLONIA reference rate (POLONIA_RATE_M)	pure number (representing a percentage)	2005M01 – 2010M12	NBP
7.	Average monthly turnover of interbank POLONIA O/N transactions (POLONIA_TURNOVER)	million PLN	2005M01 – 2010M12	NBP

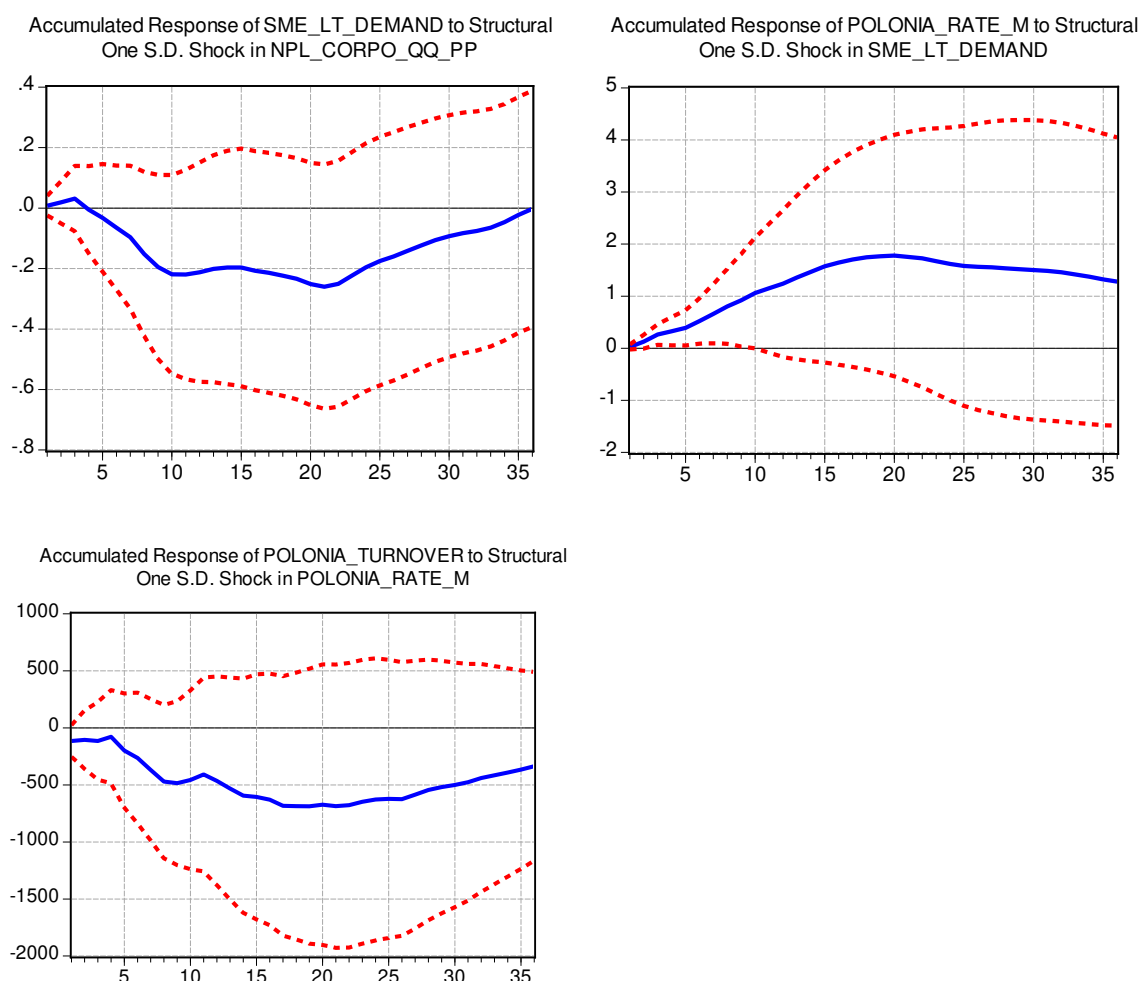
Source: NBP, GUS.

Most of the variables in this framework are self-explanatory. Quarter-on-quarter changes in the “dependent” variable were chosen as they match the characteristics of a short term approach better than the absolute values of outstanding credit, and yield more convincing estimates. Year-on-year growth in retail sales and trade sentiment indicator are standardized, unmodified economic indices published by GUS. The demand SMEs for credit is a SLOS-originated variable, with its measurement based on the net percentage method, explained earlier in this paper. The variable was directly extracted from the data. Quarterly changes in NPLs' share in total corporate loans were found to yield better results than NPLs'

absolute levels, therefore they were retained in the model in this form. POLONIA reference rate is calculated as an average weighted of the rates and amounts of transactions provided by the market players. At the moment, POLONIA rate describes, on average, 57 percent of the concluded interbank O/N transactions (see ACI Polska – The Polish Financial Markets Association, n.d.). So it is not a perfect proxy, but it still captures the actuality quite satisfactorily.

SVARs coefficients are not economically interpretable. Therefore, providing the model's exact and very extensive specification is not much of a help. Nevertheless, what matters here is the structural factorization formula, which reflects an intuitive comprehension of the economic interrelations and which allows for producing instructive impulse response functions. The variables are incorporated in the model in an identical order as presented in the table above, which means that this more or less mirrors the intuitive causality. The “dependent” variable is left in the first place. Later on, it was assumed that data on retail sales is the major stimulus, pretty much independent of the other ones. A shift in retail sales is thought to directly cause the relevant sentiment index to either boost or decline. If it declines, NPLs grow automatically. In response to this change, firms' demand for credit may either soar, if they e.g. desperately need extra liquidity, or decrease, if they e.g. want to wait till the hardships are over. Judging from SMEs' demand and weighing non-performing loans ratio, banks manage their liquidity to ensure sufficient money supply. For this purpose they trade with each other in the interbank market. There the interest rate is formed and, accordingly, the turnover is determined. This completes the reasoning behind the structural factorization procedure.



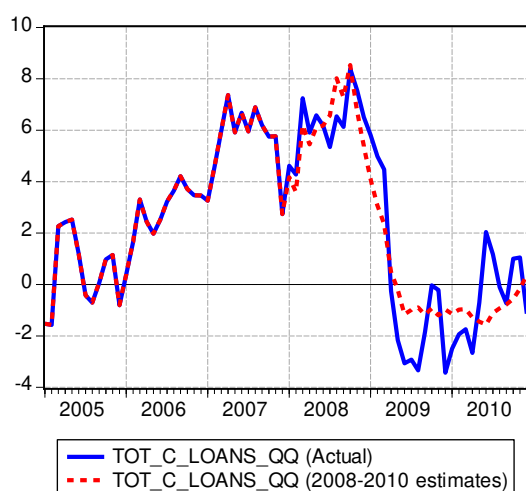


Source: EViews 5 output.

Figure 28. Crucial interplays in the model, influencing structural factorization. Increased retail sales reinforces confidence in the market. Sentiments, if enhanced, keep the corporate credit quality high (low NPLs). The lower NPLs, the more companies seeking credit opportunities. With the increased demand, the cost of money in the interbank market surges. Accordingly, the turnover figure plunges. The weakest link of this inference lies in customers' demand for credit, which – intuitively – may fluctuate twofold in response to a certain NPLs input. Here, the correlation coefficient turned out to be negative. Moreover, it is not unambiguous whether interbank interest rate should hike in response to higher demand.

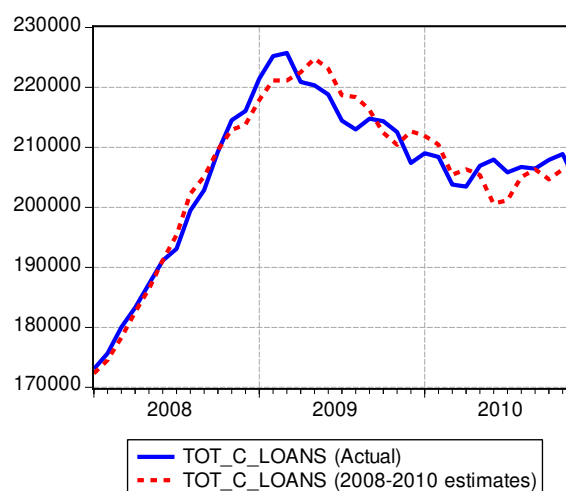
4.2.2. Performance

The deterministic model below indicates, how successfully 2005-2007 variables were in yielding 2008-2010 dependent variable's estimations, as compared with actual, already known, values. The constructed model was rather optimistic and produced over 207 billion PLN of corporate loans at the end of 2010, comparing with slightly more than 204 billion PLN factually. Modeled quarter-on-quarter fluctuations are smoother than the actual values.



Source: EViews 5 output.

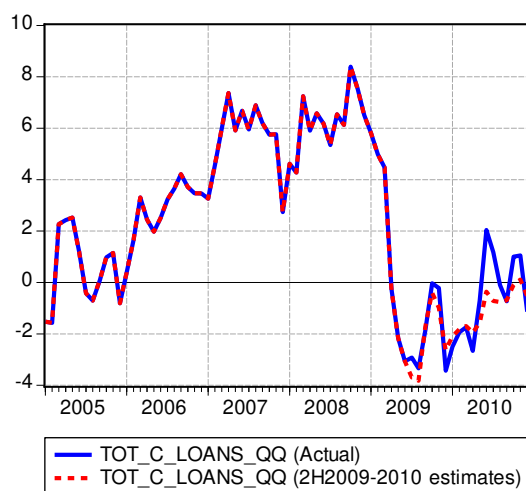
Figure 29. Deterministic model of 2008-2010 corporate quarter-on-quarter lending (percents), using 2005-2007 data as input, compared with actual values.



Source: EViews 5 output.

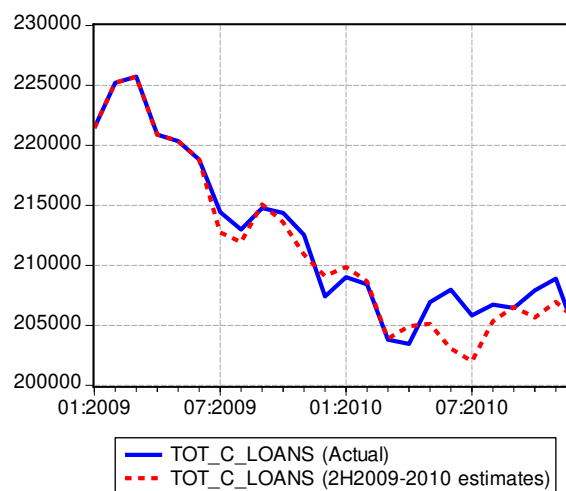
Figure 30. Deterministic model of 2008-2010 outstanding corporate loans (m PLN), using 2005-2007 data as input, compared with actual values.

Another checkpoint of the model's predictive power is made in the middle of 2009, as only 25 percent of the time span is estimated, with 75 percent of actuals. The output should thus be of enhanced quality. Although the model is still helpless in defining more exact marginal changes, it again fares well in the long run and yields plausible end-of-sample result.



Source: EViews 5 output.

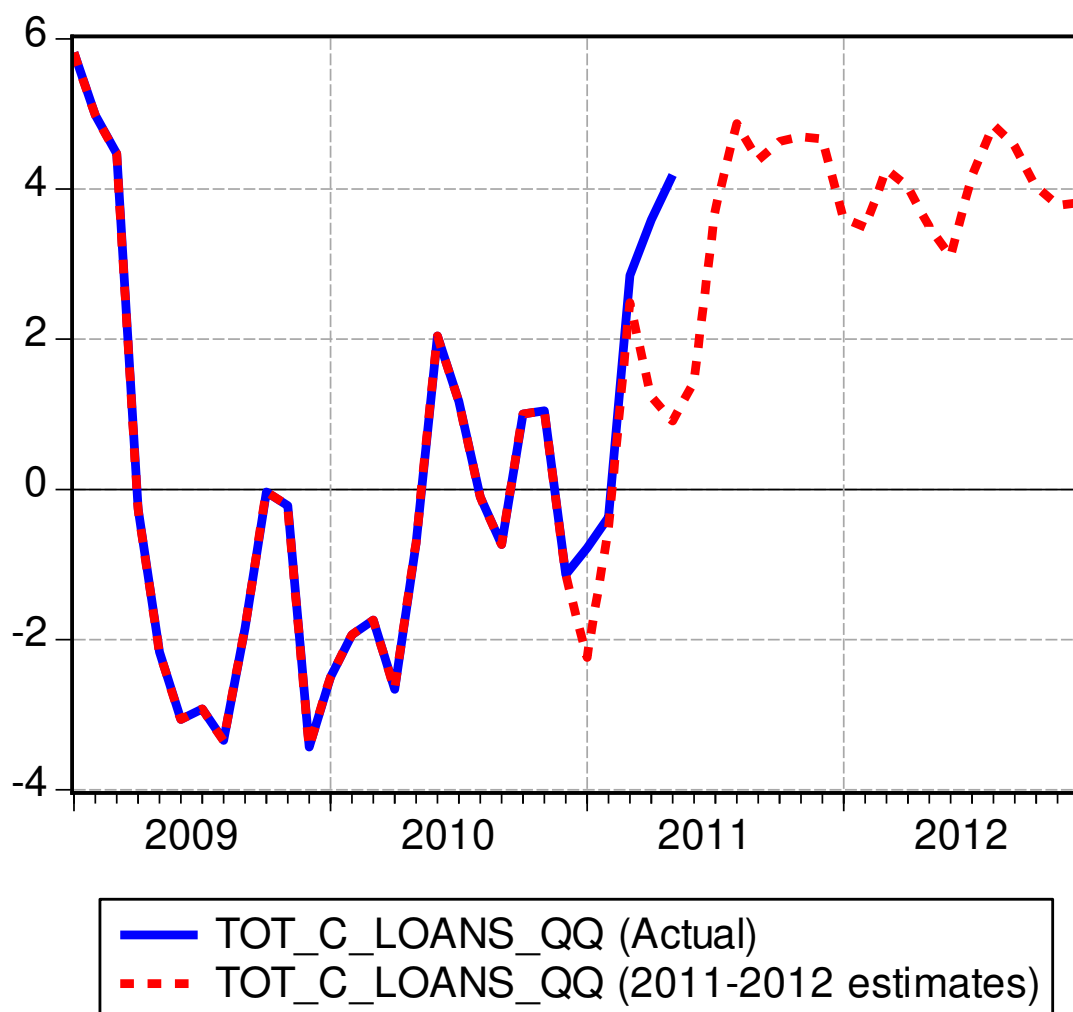
Figure 31. Deterministic model of 2H2009-2010 corporate quarter-on-quarter lending (percents), using 2005-1H2009 data as input, compared with actual values.



Source: EViews 5 output.

Figure 32. Deterministic model of 2H2009-2010 outstanding corporate loans (m PLN), using 2005-1H2009 data as input, compared with actual values.

However, the nearest future will show how usable the model really is. Particularly, how resistant it is to shrinkage, i.e. an effect in which fitted relationship performs inferior on a new data set than on the data set used for fitting. As for now, the credit crunch model successfully forecasted a rebound at the beginning of 2011. At the moment of submission of this paper, the data for five months of 2011 were available. According to the two-year forecast, the upturn is going to be fair, with a quarter-on-quarter dynamics oscillating around 4 percent.



Source: EViews 5 output.

Figure 33. Deterministic model of 2011-2012 corporate quarter-on-quarter lending fluctuations (percents), using 2005-2010 data as input, compared with actual values for the first five months of 2011.

However, it has to be made clear at this juncture that the credit crunch model is not claimed to be plausible in the long run, as it was not meant to be its task. The long term corporate lending model is subject to further exertion.

4.3. Structural analysis

As it has already been said, VAR models, whichever the variation, are difficult to interpret due to many parameters and complex interactions and feedbacks between the variables. Due to the unbelievable bulk of interactions, stirring reversal causality dilemmas, the dynamic properties of a VAR are typically summarized using various types of structural analysis. The structural analysis summary tools that I am going to use are impulse response function and variance decomposition. I present also Granger causality tests. However, the latter are only useful a priori, i.e. when constructing the model, rather than a posteriori, i.e. when diagnosing its performance.

4.3.1. Granger causality tests

Many variables have been identified to potentially influence a percentage change of outstanding corporate loans on a quarter-on-quarter basis. It does not yet indicate a viable causal link, but a certain predictive power may be associated with a vast range of variables. This “affluence trap” determined a need for a thorough search of the model’s best specification and numerous iterations have been performed. The experiment below was conducted only for the variables having their “roots” dated earlier than 2002, in order to assure significant dissimilarities between the full time series and its truncated counterpart. The analysis may serve as preliminary diagnostics for the forthcoming construction of the long term corporate lending model.

Again, the notion of Granger causality does not necessitate true causality. It only implies forecasting ability (Zivot and Wang, 2003: 405).

Table 9. Granger causality tests run for quarter-on-quarter percentage change in outstanding corporate loans, with six lags. Stars indicate significance at the 0.01 (***), 0.05 (**) and 0.1 (*) levels. Variables performing by at least one significance threshold better in one of model options have been bolded.

		Long-term period (1996M12 2010M12)		Credit crunch model (2005M01 2010M12)	
1.	Year-on-year change in retail sales	YES	**	YES	***
2.	Unemployment	YES	**	NO	-
3.	Confidence index in the economy	YES	***	YES	***
4.	Industry confidence index	YES	**	YES	***
5.	Consumer confidence index	YES	***	YES	***

		Long-term period (1996M12 2010M12)		Credit crunch model (2005M01 2010M12)	
6.	Trade confidence index	YES	*	YES	*
7.	Construction sector confidence index	YES	***	YES	***
8.	Non-performing non-financial sector loans	YES	*	YES	**
9.	Non-performing corporate loans	NO	-	YES	***
10.	Banks' deposit base	YES	**	YES	**
11.	Quarter-on-quarter change in foreign indebtedness of non-banking and non-government sectors	NO	-	YES	**
12.	Quarter-on-quarter change in the net foreign assets of the Polish banking sector	NO	-	YES	**

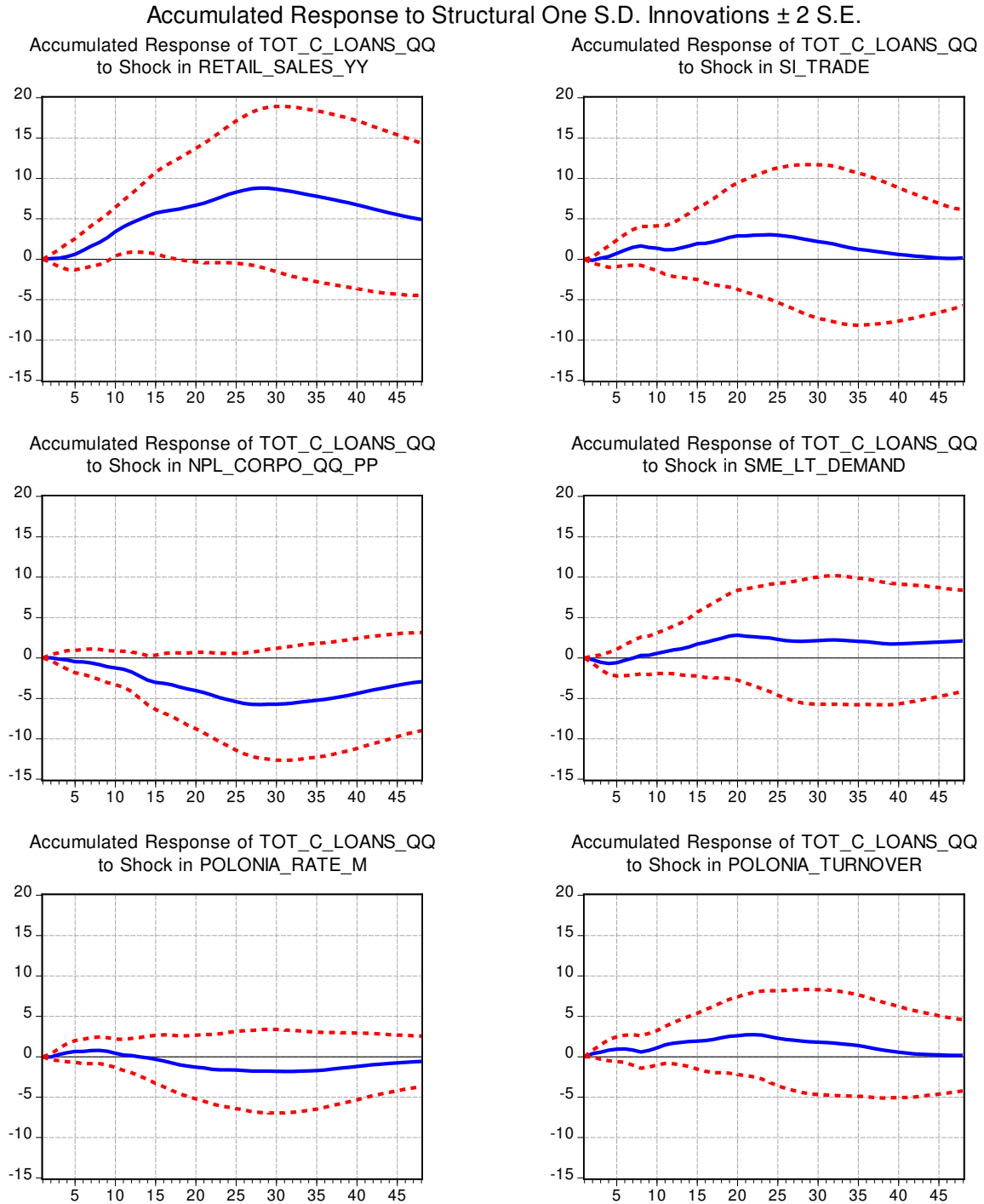
Source: EViews 5 output.

As the table indicates, some variables are only dedicated to the short-term analysis (foreign indebtedness of economic agents, net foreign assets of the banking sector, non-performing loans), whereas unemployment is purely long-term lending determinant, with no short-term utility. Unfortunately, the shortage of truly long time series limited the comparison of Granger tests to only twelve variables.

4.3.2. Impulse response functions

Impulse response functions are keys to understand the outcome of every VAR-type model. They indicate how a given variable reacts to external shocks in the dynamic system. Figures below plot the impulse responses to various shocks together with two standard error intervals. The impact of some shocks takes time to feed through to the economy to reach the peak value. The relatively fastest reaction of corporate lending levels is in response to the trade confidence index. As it may be seen, a boost in retail sales is the biggest contributor to the increased lending. Taking decent consumer demand for granted, both banks are more tuned to lend, and enterprises are eager to borrow. It is quite analogical with an indicator of sentiment in trade. However, the magnitude of this shock is slighter.

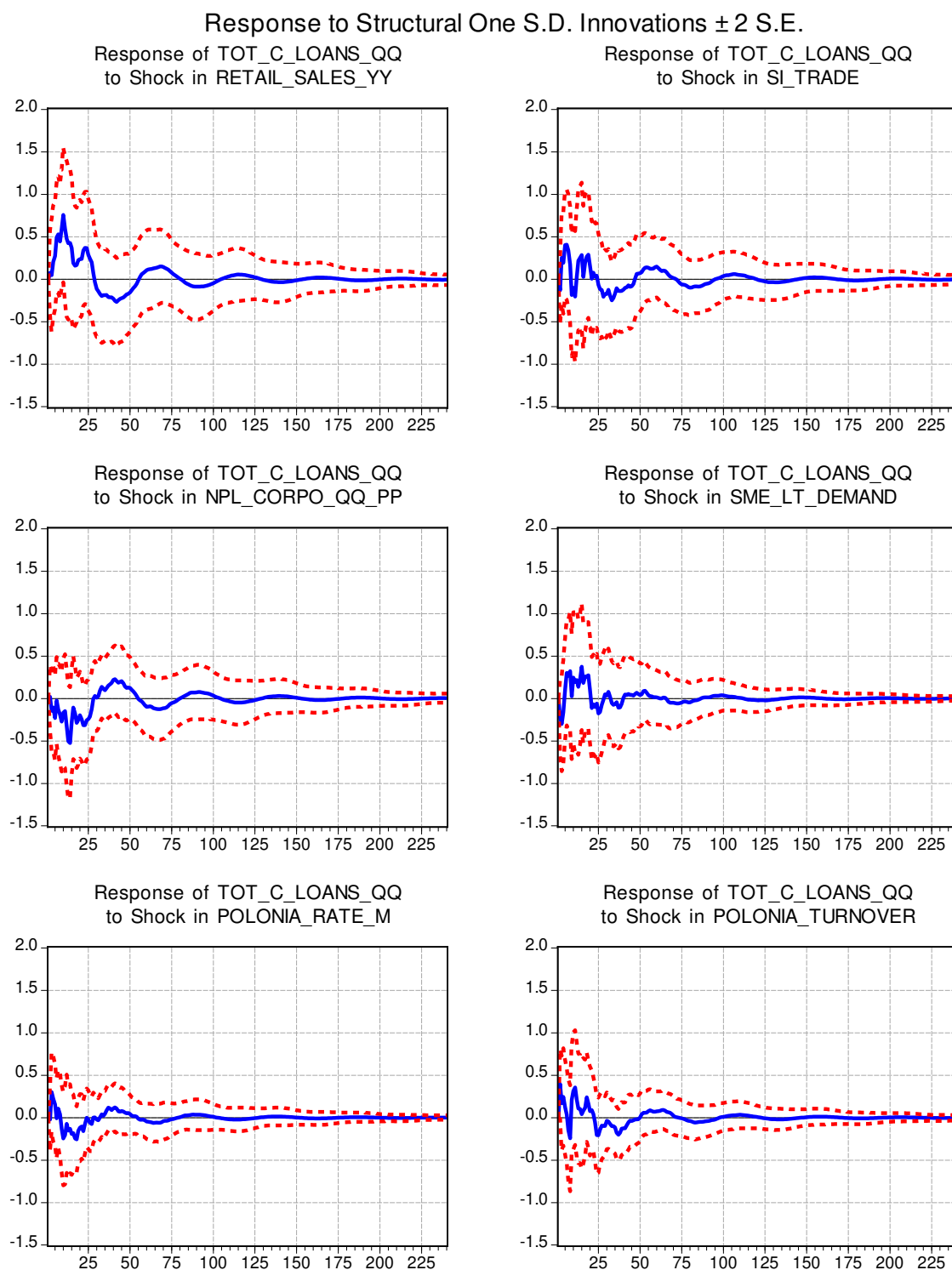
It should be emphasized that the analyzed short-term model is quite robustly based on indirect variables, like retail sales or trade sentiment indicator. Due to multiple links between various variables, even these cannot be considered purely non-fundamental, though.



Source: EViews 5 output.

Figure 34. Impulse response functions depicting accumulated response of a quarter-on-quarter change (percent) in total outstanding corporate loans, to structural one standard deviation shocks in the indicated variables. Abscissas indicate time (in months).

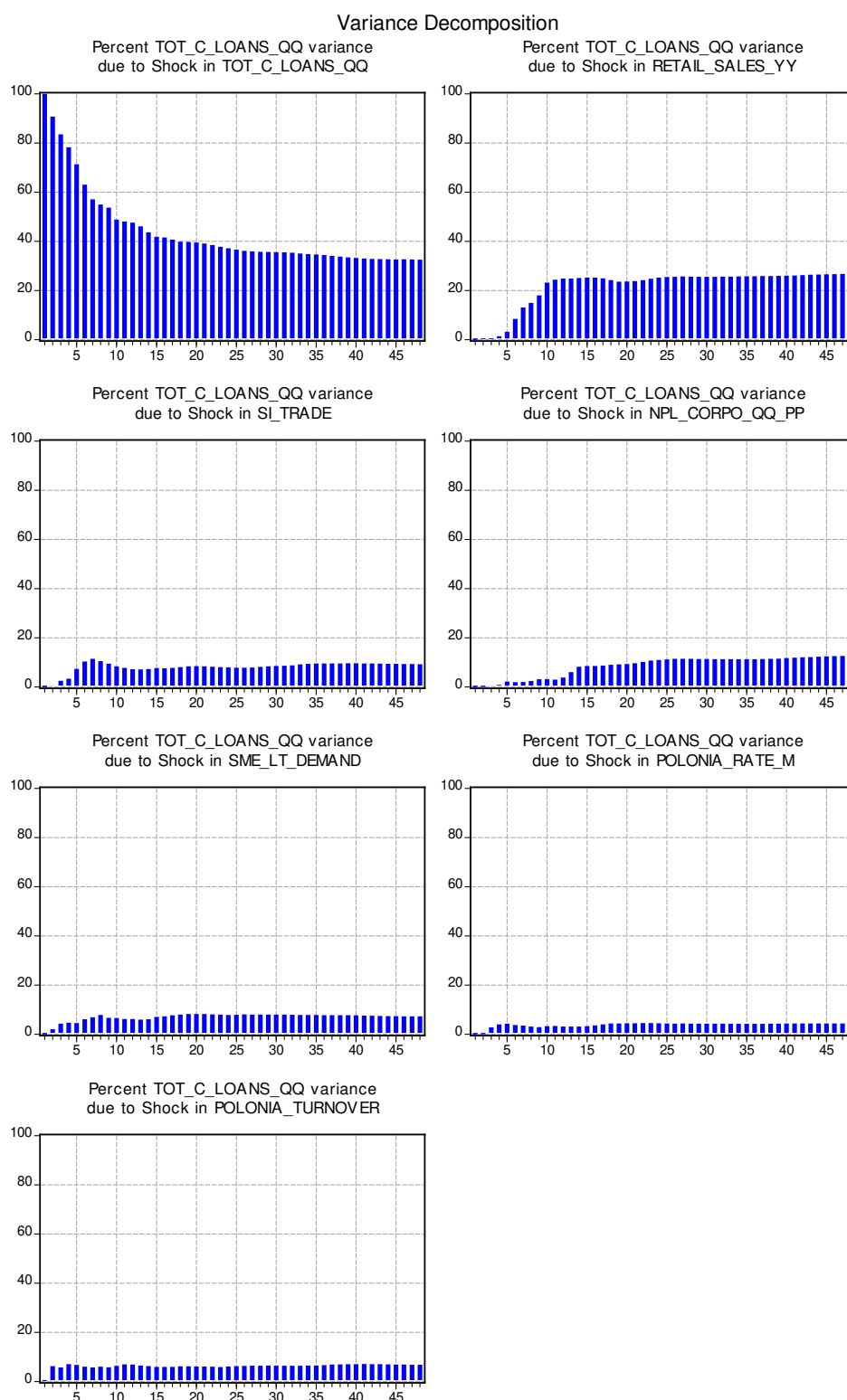
In order to prove the stability of impulse response function, a 20-year perspective is provided:



Source: EViews 5 output.

Figure 35. Impulse response functions depicting response of a quarter-on-quarter change (percent) in total outstanding corporate loans, to structural one standard deviation shocks in the indicated variables. Abscissas indicate time (in months). Impulse response functions are here non-accumulated and run for 20 years to present their stability.

4.3.3. Variance decomposition



Source: EViews 5 output.

Figure 36. Variance decomposition charts depicting the share of shocks related to the indicated variables in the “explained” variable’s variance. Abscissas indicate time (in months).

Variance decomposition analysis provides additional source of insight. It may be seen that particular shocks are not very dramatic, each of them accounting for no more than 20 percent of the “explained” variable’s variance. The response of the “explained” variable that is due to itself is somewhat elevated, which signals autoregression. However, it does not appear to ruin the interpretation in the underlying framework.

CHAPTER V

CONCLUSIONS

The key findings of the underlying credit crunch econometric model and the accompanying qualitative analysis are only partly intuitive, with some rather unexpected outcomes. Those who have been voicing prophecies that foreign-based parent banks will drain the domestic banking industry from capital, were wrong. Instead, the theory that foreign ownership alleviates shocks proved to be right. Those who believed that the contraction of credit is caused in equal extent by supply-side and demand-side factors, also did not capture the reality accurately. Weakened demand had its impact, mainly in 2010 when some banks started to lend more courageously again, but it was not a decisive determinant. Despite premature calls audible in the early stages of the crisis that liquidity in the sector has to be reinforced, the liquidity standing of most banks remained very good. Apparently, the underlying problem was psychological, as banks were hoarding the cash instead of distributing it in form of credits, and were also unwilling to lend to each other in the interbank market, which hampered short-term liquidity position of some banks. Monetary policy was balanced and regulatory measures practically did not exert any influence on corporate lending. The central bank failed to animate the interbank market and reduce interest rate spreads that became highly distorted. Those banks that did not have either reliable foreign funding or strong deposit base, were the major victims of the interbank market imperfections. Overall, the research has shown that behavioral determinants, at first sight remote from the issue of corporate credit, wield profound explanatory power. Retail sales and trade sentiment index, being the “litmus paper” of the general economic climate, both account for approximately 35 percent of corporate credit fluctuations. Boosted non-performing loans, indicating that something ill takes place in the economy, explain approximately 15 percent of the variance in the long run. However, quite interestingly, relative measures of NPLs have been found to be a much more accurate regressor than their absolute measures. which signals adaptive expectations. It seems that the economy that once got rid of unsustainably high NPLs, is more sensitive to their even minor increase later on. Last but not least, quarter-on-quarter corporate lending exhibits quite intense autocorrelation, explaining roughly more than 40 percent of its own variance up to 18 months, and less than 40 percent of its own variance afterwards. This effect may occur due to several reasons, which are subject to further analysis, e.g.: rolling over debt into subsequent periods, staged financing or the stylized fact of volatility clustering.

As regards the subject matter elaborated here, this study is undoubtedly a preliminary one, particularly in terms of econometric modeling. There are numerous directions to which the further analysis may fruitfully take off from here. First, boom and bust cycles, identified throughout the sample period, may be put under more precise investigation to determine the mutable behavior of given variables with regard to contemporary macroeconomic environment. Second, a greater effort may be applied to granulate the data, e.g. to split the affected indebtedness volume into short-term and long-term, or to control for industries, which have suffered most, which would signpost their disadvantaged strategic positioning. More informative output would be obtained on what factors or behaviors entail which feedback. Third, a similar attempt may be made to capture the household credit supply and demand determinants. However, this case would probably require refining the here presented approach quite substantially. Exercising on this topic might get deeper, but it requires long time-series, as well as more comprehensive ones. Unfortunately such long series are not currently available for Poland, since it embarked on its transition only in the early 1990s and it took time to achieve decent stock of statistical data. With particular respect to the current crisis, time is also needed to unravel additional facts regarding the crunch. Naturally, the enriched econometric analysis, putting alternative specifications and methods in place, would furthermore contribute to the greater understanding of how influences were distributed.

This analysis is ex-post and it would not be impossible if the interrelations presented here were one-off. However, the forecasting potential of the presented model is subject to prompt verification. Naturally, other specifications capturing the pertinent issue are feasible, provided that alternative, compelling theoretical framework is developed. The inescapable constraint of the here developed model is also its non-universality, in a sense that it is relevant exclusively to the Polish market. While analyzing the phenomenon of the crisis, one should also be aware of the fact that it is still “living” and no ultimate conclusions should be derived, as scholars generally agree that the slowdown may still get worse. Meanwhile, however, the first quarter of 2011 was already a fourth in a row, in which banks reduced margins for corporate loans (Tomaszkiewicz, 2011). This bodes well for future. Demand rebuilds accordingly and the outstanding corporate credit arose month-on-month by 0.9 percent and exceeded 209 billion PLN in March 2011, that is the highest level since November 2009. Year-on-year growth rates in March, April and May were all within the range between 4 and 6.4 percent, and with deposits rising even faster – but slower than in 2010 – robust fundamentals underlying the forthcoming revival are placed, which is mirrored by elevated Moody’s rating for the Polish banking sector, from negative to stable, dated mid-June.

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INDEX OF ACRONYMS AND ABBREVIATIONS

CDO: Collateralized debt obligations

CEE: referring to the Central and Eastern Europe

CHF: Swiss franc, a currency

CRI: Credit Risk Indicator, a synthetic measure of risk associated with a given category of credit

ECB: European Central Bank

EUR: Euro, a currency

FCY: Foreign currencies

GUS: stands for Główny Urząd Statystyczny, the Polish Central Statistical Office

IMF: International Monetary Fund

KNF: stands for Komisja Nadzoru Finansowego, the Polish Financial Supervision Authority

M&A: Mergers and acquisitions

NBP: stands for Narodowy Bank Polski, the National Bank of Poland

NPL: Non-performing loans

PLN: Polish zloty, a currency

SLOS: Senior Loan Officer Survey, a quarterly survey conducted by the National Bank of Poland, directed to the banks' senior loan officers

SME: Small and medium-sized enterprises

USD: United States' dollar, a currency

WIBOR: Warsaw Interbank Borrowing Rate

REFERENCES

- ACI Polska – The Polish Financial Markets Association (n.d.) *POLONIA*, retrieved online from <http://www.acipolska.pl/polonia-en.html> (20 May 2011).
- Altunbas, Y., Gambacorta, L. and Marqués, D. (2007) *Securitisation and the Bank Lending Channel*, Working Paper Series No. 838 (December), Frankfurt am Main: European Central Bank.
- Balakrishnan, A. (2008) *Financial crisis: action taken by central banks and governments*, guardian.co.uk, 21 October, retrieved from <http://www.guardian.co.uk/business/2008/oct/13/creditcrunch-marketturmoil1> (2 May 2011).
- Bank BPH (2010) *Raport specjalny: Perspektywy rynku kredytowego w Polsce*, Nawigator – Miesięcznik Makroekonomiczny Banku BPH, Vol. 10 (October), retrieved from http://www.bm.bph.pl/komentarze/nawigator/nawigator_2010.10.12.pdf (12 October 2010).
- Berger, A. N., Molyneux, P. and Wilson, J. O. S. (eds.) (2010) *The Oxford Handbook of Banking*, Oxford: Oxford University Press.
- Bernanke, B. S. and Blinder, A. (1988) *Credit, Money, and Aggregate Demand*, The American Economic Review, Vol. 78, No. 2 (May), pp. 435-439.
- Bernanke, B. S. and Gertler, M. L. (1995) *Inside the Black Box: The Credit Channel of Monetary Policy Transmission*, Journal of Economic Perspectives, Vol. 9, Issue 4 (Fall), pp. 27-48.
- Bernanke, B. S. and Lown, C. S. (1991) *The Credit Crunch*, Brookings Papers on Economic Activity, Vol. 2, pp. 205-246.
- Bijapur, M. (2010) *Does monetary policy lose effectiveness during a credit crunch?*, Economics Letters, Vol. 106, Issue 1, pp. 42-44.
- Bonin, J. P., Hasan, I. and Wachtel, P. (2005) *Bank performance, efficiency and ownership in transition countries*, Journal of Banking & Finance, Vol. 29, Issue 1 (January), pp. 31-53.
- Borio, C. and Zhu, H. (2008) *Capital regulation, risk taking and monetary policy: A missing link in the transmission mechanism?*, BIS Working Papers 268, Bank for International Settlements.
- Bratkowski, A. and Myjak, J. (2009) *Credit crunch w Polsce?*, Zeszyty BRE Bank – CASE, No. 105, Warsaw: CASE-Centrum Analiz Społeczno-Ekonomicznych – Fundacja Naukowa and BRE Bank SA.

- Brooks, P. and Zank, H. (2004) *Attitudes on Gain and Loss Lotteries: A Simple Experiment*, Manchester: The University of Manchester.
- Brunnermeier, M. K. (2009) *Deciphering the Liquidity and Credit Crunch 2007–2008*, Journal of Economic Perspectives, Vol. 23, No. 1 (Winter), pp. 77–100.
- Brzoza-Brzezina, M. and Makarski, K. (2010) *Credit Crunch in a Small Open Economy*, National Bank of Poland Working Paper No. 75, Warsaw.
- Buch, C. M., Eickmeier, S. and Prieto, E. (2011) *In search for yield? Survey-based evidence on bank risk taking*, Discussion Paper Series: Economic Studies No. 10, Frankfurt am Main: Deutsche Bundesbank, retrieved from <http://econstor.eu/bitstream/10419/45640/1/659403269.pdf> (16 June 2011).
- Canova, F. (2007) *Methods for Applied Macroeconomic Research*, Princeton and Oxford: Princeton University Press.
- Cetorelli, N. and Goldberg, L. S. (2008) *Banking globalization, monetary transmission, and the lending channel*, NBER Working Paper 14101 (June), Cambridge, MA: National Bureau of Economic Research, retrieved from <http://www.nber.org/papers/w14101> (22 September 2010).
- Chądryński, M. (interviewer) and Zielińska-Głębocka, A. (interviewee) (2010) *Podwyżki stóp będą niewielkie*, Dziennik Gazeta Prawna, 18 March.
- Chmielewski, T. (2004) *Interest rate pass-through in the Polish banking sector and bank-specific financial disturbances*, National Bank of Poland, retrieved from http://mpira.ub.uni-muenchen.de/5133/1/MPRA_paper_5133.pdf (19 March 2011).
- Chmielewski, T. (2006) *Bank Risks, Risk Preferences and Lending* (preliminary), National Bank of Poland, retrieved from http://mpira.ub.uni-muenchen.de/5131/1/MPRA_paper_5131.pdf (20 March 2011).
- Czerwińska, D. and Wilkowicz, Ł. (2011) *Firmy chętniej pożyczają pieniądze w bankach*, Rzeczpospolita, 15 April.
- Daruk, W., Michalewska, B., Stalkowski, B. (n.d.) *Proces internacjonalizacji sektora bankowego w Polsce – realne zagrożenie, czy nieuzasadnione obawy?*, mimeo.
- De Haas, R. and van Lelyveld, I. (2006) *Foreign Banks and Credit Stability in Central and Eastern Europe: A Panel Data Analysis*, Journal of Banking & Finance, Vol. 30, Issue 7 (July), pp. 1927–1952, retrieved from <http://www.sciencedirect.com/science/article/B6VCY-4H21K9V-2/2/1cb07dc27e17c7a07d56a242818a97cc> (4 March 2011).
- Economist Intelligence Unit (2008) *World financial services outlook: A selective crunch*, EIU Industry Briefing database, retrieved from http://www.eiu.com/index.asp?layout=ib3Article&article_id=1123621297 (10 November 2010).

- Economist Intelligence Unit (2009) *World banks outlook: Crisis at the centre spreads worldwide*, EIU Industry Briefing database, online access restricted (3 March 2011).
- Foley, S. (2007) *Anatomy of a credit crunch*, The Independent, 27 July, retrieved from <http://www.independent.co.uk/news/business/analysis-and-features/anatomy-of-a-credit-crunch-459209.html> (28 April 2011).
- Furceri, D. and Zdzienicka, A. (2011) *The real effect of financial crises in the European transition economies*, Economics of Transition, Vol. 19, Issue 1 (January), pp. 1–25.
- Gadomski, W. (2009) *Ekonomia kryzysu. Pięć zaleceń na trudne czasy*, Gazeta Wyborcza, 14 September, retrieved from http://wyborcza.pl/dziennikarze/1,104622,7034229,Ekonomia_kryzysu__Piec_zalecen_na_trudne_czasy.html (11 November 2010).
- Ganev, G. Y., Molnar, K., Rybiński, K. and Woźniak, P. (2002) *Transmission Mechanism of Monetary Policy in Central and Eastern Europe*, CASE Network Reports No. 52, retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1432336 (20 February 2011).
- Gambacorta, L. and Marques-Ibanez, D. (2010) *The New Bank Lending Channel: Lessons from the Crisis*, Fifty-Second Panel Meeting of Economic Policy, retrieved from http://www.cepr.org/meets/wkcn/9/979/papers/Gambacorta_marques-ibanez.pdf (25 May 2011).
- Gardner, W. D. (2008) *Venture Capital Outlook Good Despite Downturn*, InformationWeek, 20 October, retrieved from <http://www.informationweek.com/news/global-cio/smb/211202008> (4 May 2011).
- Głapiak, E. (2008) *Jeśli banki będą pożyczać, firmy nie przestaną inwestować*, Rzeczpospolita, 19 December, retrieved from <http://www.rp.pl/artykul/236550.html> (17 March 2011).
- Głapiak, E. (2011) *Rekordowa transakcja NBP, bank zebrał z rynku ponad 100 mld zł*, Rzeczpospolita, 16 April, retrieved from <http://www.rp.pl/artykul/643909.html> (2 May 2011).
- Gorton, G. B. (2008) *The Panic of 2007*, Yale ICF Working Paper No. 08-24, retrieved from <http://ssrn.com/abstract=1255362> (28 June 2011).
- Grabek, G., Kłos, B., Kokoszcyński, R., Łyziak, T., Przystupa, J. and Wróbel, E. (2008), *Porównanie podstawowych cech mechanizmu transmisji monetarnej w Polsce i w strefie euro*, Warsaw.
- Grodzicki, M., Hałaj, G. and Żochowski, D. (2010) *Commercial Bank Lending Policy and Loan Supply*, retrieved from <http://www.grzegorzhalaj.pl/LoanSupplySurveys.pdf> (18 March 2011).

- Grzyb, R. (2008) *Banki mogą transferować zyski za granicę, KNF będzie czuwał*, Gazeta Prawna, 17 October, retrieved from http://biznes.gazetaprawna.pl/artykuly/90356, banki_moga_transferowac_zyski_za_granice_knf_bedzie_czuwal.html (9 March 2011).
- Haselmann, R. and Wachtel, P. (2009) *Bankers Perception of the Legal Environment and the Composition of Bank Lending: Evidence from the Transition Countries*, New York University Stern School of Business, retrieved from http://pages.stern.nyu.edu/~pwachtel/images/HW_Perception_Law_Lending_May09.pdf (15 June 2011)
- Havrylchyk, O. (2005) *Banking Efficiency, Consolidation and Foreign Ownership: Evidence from the Polish Banking Market*, European University Viadrina, mimeo.
- Hempell, H. S. and Sørensen, Ch. K. (2010) *The Impact of Supply Constraints on Bank Lending in the Euro Area: Crisis Induced Crunching?*, ECB Working Paper Series No. 1262 (November), Frankfurt am Main: European Central Bank, retrieved from http://ssrn.com/abstract_id=1698040 (15 February 2011).
- Henry, D. (2010) *Citigroup, BofA, JPMorgan's Idle Cash Drags on Profit* (Update 1), retrieved from http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aSsgAm6EE7_g (16 February 2010).
- Hutchinson, M. (2007) *Anatomy of a credit crunch*, PrudentBear.com, 8 August, retrieved from <http://www.thespaceplace.net/news/2007q2.php> (28 April 2011).
- Iskra, J. (2009) *Banki: mniej depozytów u spółek-matek*, Gazeta Prawna, 3 March, retrieved from http://biznes.gazetaprawna.pl/artykuly/116796,banki_mniej_depozytow_u_spolek_matek.html (9 March 2011).
- Jankowiak, J. (2008), *Jak funding gap wpływa na sferę realną?*, 19 October, retrieved from <http://januszjankowiak.bblog.pl/wpis,jak;funding;gap;wplywa;na;sfere;realna,15544.html> (9 March 2011).
- Johansen, S. and Juselius, K. (1990) *Maximum Likelihood Estimation and Inference on Cointegration, with Applications to the Demand for Money*, Oxford Bulletin of Economics and Statistics, Vol. 52, Issue 2 (May), pp. 169-210.
- Kakes, J. (2000) *Monetary Transmission in Europe: The Role of Financial Markets and Credit*, Cheltenham and Northampton, MA: Edward Elgar Publishing.
- Kamil, H. and Rai, K. (2009) *The Global Credit Crunch and Foreign Banks' Lending to Emerging Markets: Why Did Latin America Fare Better?*, IMF Working Paper WP/10/102, Washington: International Monetary Fund.
- Kawalec, S. (2008) *Jak obronić gospodarkę przed kryzysem*, Warsaw, retrieved from <http://www.batory.org.pl/debaty/kryzys.htm> (15 May 2011).
- Kennedy, P. (2003) *A guide to econometrics*, Oxford: Blackwell Publishing.

- Kochalska, H. (2011) *Kredyty mocno ruszyły*, 14 June, retrieved from <http://prnews.pl/analizy/kredyty-mocno-ruszyly-62011.html> (14 June 2011).
- Kokot, K., Reich, A., Sułek, I. and Zaręba, J. (2004) *Polski sektor bankowy po wejściu Polski do Unii Europejskiej*, Zeszyty BRE Bank – CASE, No. 71, Warsaw: CASE-Centrum Analiz Społeczno-Ekonomicznych – Fundacja Naukowa and BRE Bank SA.
- Kruszka, M. (2011) *Banki zależne od zagranicznych instytucji finansowych – wybrane aspekty stabilności systemów finansowych w krajach Europy Środkowo-Wschodniej*, Warsaw: Polish Financial Supervision Authority, retrieved from http://www.knf.gov.pl/Images/Banki_zalezne_220211_tcm75-25646.pdf (3 March 2011).
- Kuk, M. (2009) *Zastój w kredytach dla firm*, Rzeczpospolita, 15 April.
- Łyziak, T. (2001) *Monetary transmission mechanism in Poland: Theoretical concepts vs. evidence*, Warsaw: National Bank of Poland.
- Łyziak T., Przystupa J., Wróbel E. (2008), *Monetary Policy Transmission in Poland: A Study of the Importance of Interest Rate and Credit Channels*, SUERF Studies No. 2008/1, Vienna: SUERF, retrieved from <http://www.suerf.org/download/studies/study20081.pdf> (2 March 2011).
- Matousek, M. and Sarantis, N. (2007) *The Bank Lending Channel and Monetary Transmission in Central and Eastern European Countries*, Centre for International Capital Markets at London Metropolitan University.
- Mbewe, R. (2009) *The threat of a new credit crunch grows*, Warsaw Business Journal, 1 June, retrieved from <http://www.wbj.pl/article-45665-the-threat-of-a-new-credit-crunch-grows.html> (11 January 2011).
- Mbewe, R. (2011) *System bankowy 2011 – czas na łapanie oddechu?*, <http://prnews.pl/nasz-gosc/richard-mbewe-system-bankowy-2011-czas-na-lapanie-oddechu-58727.html> (26 January 2011).
- Milne, A. (2009) *The fall of the house of credit: what went wrong in banking and what can be done to repair the damage?*, Cambridge, UK: Cambridge University Press.
- Milne, A. and Wood, G. E. (2009) *The bank lending channel reconsidered*, Bank of Finland Research Discussion Paper No. 2/2009, retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1346361 (2 April 2011).
- Münchau, W. (2009) *The Meltdown Years: The Unfolding of the Global Economic Crisis*, New York: McGraw-Hill.
- Murphy, D. (2009) *Unravelling the Credit Crunch*, Boca Raton, FL: CRC Press, Taylor & Francis Group.

- National Bank of Poland (2010) *Sprawozdanie z działalności NBP w 2009 roku*, Warsaw: Author.
- National Bank of Poland (2011a) *Informacja o kondycji sektora przedsiębiorstw ze szczególnym uwzględnieniem stanu koniunktury w I kw. 2011 oraz prognoz koniunktury na II kw. 2011*, NBP's Economic Institute: Bureau of Corporations, Households and Markets, retrieved from http://www.up.gov.pl/uploads/media/Koniunktura-raport_z_2_kwartal_2011.pdf (28 June 2011).
- National Bank of Poland (2011b), *Sytuacja na rynku kredytowym: wyniki ankiety do przewodniczących komitetów kredytowych*, various releases dated 2004-2011, available online: <http://nbp.pl/home.aspx?f=/systemfinansowy/kredytowy2009.html>.
- Olczak, M. A. (2010) *Przedsiębiorcy boją się inwestować*, Dziennik Gazeta Prawna, 18 August.
- Olczak, M. A. (2011) *Kredyty dla firm są drogie i nie będą tanieć*, Dziennik Gazeta Prawna, 3 January.
- Pawłowska, M. (2010) *Competition in the Polish Banking Sector*, Gospodarka Narodowa (National Economy), Vol. 21, No. 5-6 (May-June), pp. 91-119.
- Pietryka, I. (2010) *Short-term Liquidity of the Polish Banking Sector Under the Operations of the National Bank of Poland in Period January 2009 – April 2010*, Toruń: Nicolaus Copernicus University.
- Pietrzyk, G. (2005) *Nadpłynność krajowego sektora banków komercyjnych w roli czynnika zakłócającego transmisję impulsów polityki pieniężnej do sfery realnej*, e-Finanse: finansowy kwartalnik internetowy, No. 4/2005, retrieved from <http://www.e-finance.com/artykuly/33.pdf> (16 February 2011).
- Pixley, J. (2004) *Emotions in Finance: Distrust and Uncertainty in Global Markets*, Cambridge, UK: Cambridge University Press.
- Polish Financial Supervision Authority (2010) *Polski rynek finansowy w obliczu kryzysu finansowego w latach 2008-2009*, Warsaw: Author.
- Polish Leasing Association (2010), *Statistics*, various releases dated 2007-2010, available online: <http://www.leasing.org.pl/en/statystyki/2010>.
- Rajan, R. G. (2005) *Has Financial Development Made the World Riskier?*, NBER Working Paper Series No. 11728 (November), retrieved from <http://www.nber.org/papers/w11728> (28 June 2011).
- Richtel, M. (2007) *Subprime Fallout Could Help Venture Capitalists*, The New York Times, 24 August, retrieved from <http://www.nytimes.com/2007/08/24/business/24venture.html?ex=1345608000&en=8dc396db630388aa&ei=5088&partner=rssnyt&emc=rss> (4 May 2011).

- Rochet, J.-Ch. (2007) *Why Are There So Many Banking Crises? The Politics and Policy of Bank Regulation*, Princeton and Oxford: Princeton University Press.
- Samcik, M. (2009) *NBP zachęca, KNF nie straszy, a złoty nie spada. Bliżej do kredytowej odwilży?*, Gazeta Wyborcza, 23 April, retrieved from http://wyborcza.biz/biznes/1,101562,6529572,NBP_zacheca__KNF_nie_straszy__a_zloty_nie_spada__Blizej.html (15 May 2011).
- Schmitz, B. (2004) *What Role do Banks play in Monetary Policy Transmission in EU New Member Countries?*, Bonn: University of Bonn.
- Steijvers, T. and Voordeckers, W. (2009) *Collateral And Credit Rationing: A Review of Recent Empirical Studies As A Guide For Future Research*, Journal of Economic Surveys, Vol. 23, Issue 5 (December), pp. 924-946.
- Stiglitz, J. E. and Weiss, A. (1981) *Credit Rationing in Markets with Imperfect Information*, The American Economic Review, Vol. 71, No. 3 (June), pp. 393-410, retrieved from <http://www.jstor.org/stable/1802787> (13 June 2011)
- Szpunar, P. (ed.) (2010) *Financial Stability Report July 2010*, Warsaw: National Bank of Poland, retrieved from http://www.nbp.pl/en/systemfinansowy/financial_stability_report_2010_07_en.pdf (20 May 2011).
- Szymborska-Sutton, A. (2011) *Kredyt, który otwiera sejf unijny*, Puls Biznesu, 15 April, retrieved from <http://makro.pb.pl/2409775,30438,kredyt-ktory-otwiera-sejf-unijny> (4 May 2011)
- Tomaszkiewicz, B. (2011) *Banki preferują biznes*, Dziennik Gazeta Prawna, 26 January.
- Tornell, A. and Westermann, F. (2003) *Credit Market Imperfections in Middle Income Countries*, CESifo Working Paper Series No. 960 (June), retrieved from <http://ssrn.com/abstract=417343> (15 May 2011).
- Twaróg, E. (2010) *Pożyczkowy klincz*, Puls Biznesu, 12 July.
- Varela, L. (2011) *Sector Heterogeneity and Credit Market Imperfections in Emerging Markets*, Paris School of Economics, retrieved from <http://www.bgse.uni-bonn.de/graduate-program-1/exchange-program/liliana-varela> (29 June 2011).
- Wang, Z., Kutan, A. M. and Yang, J. (2005) *Information flows within and across sectors in Chinese stock markets*, The Quarterly Review of Economics and Finance, Vol. 45, Issues 4-5 (September), pp. 767-780, retrieved from <http://www.sciencedirect.com/science/article/pii/S1062976903000759> (29 June 2011)
- Warsaw Voice, The (2009) *Bankers call for easing of restrictions on the sector*, 7 January, retrieved from <http://www.warsawvoice.pl/WVpage/pages/article.php/7590/news> (18 November 2010).

- Wdowiński, P. (2011) *Ekonometryczna analiza popytu na kredyt w polskiej gospodarce*, Warsaw: Polish Financial Supervision Authority, retrieved from http://www.knf.gov.pl/Images/Popyt_na_kredyt_DAR_150211_tcm75-25592.pdf (26 February 2011).
- Więclaw, E., Kurasz, J. (interviewers) and Stypułkowski, C. (interviewee) (2011) *Nie używam słowa „nigdy”*, Rzeczpospolita, 13 January.
- Wilkowicz, Ł. (2009) *Nie było „credit crunch” z prawdziwego zdarzenia*, Parkiet, 20 November.
- Wilkowicz, Ł. (2011a) *NBP sprzedał bony za 81,4 mld złotych*, Parkiet, 22 January.
- Wilkowicz, Ł. (2011b) *Nowe operacje NBP mają dodatkowo ustabilizować stopy*, Parkiet, 13 June.
- Woreta, R., Sankowski, R. and Sepielak, P. (2010) *Źródła narastania akcji kredytowej w warunkach integracji walutowej: przyczyny boomów kredytowych w Irlandii, Hiszpanii i Portugalii*, Warsaw: Polish Financial Supervision Authority, retrieved from http://www.knf.gov.pl/Images/zrodla_narastania_akcji_kredytowej_tcm75-24075.pdf (26 February 2011).
- Zaleska, M. (2010) *Polskie banki – stan i wyzwania*, Gazeta Bankowa, 1 July.
- Zivot, E. and Wang, J. (2003) *Modeling Financial Time Series with S-Plus*, New York: Springer.